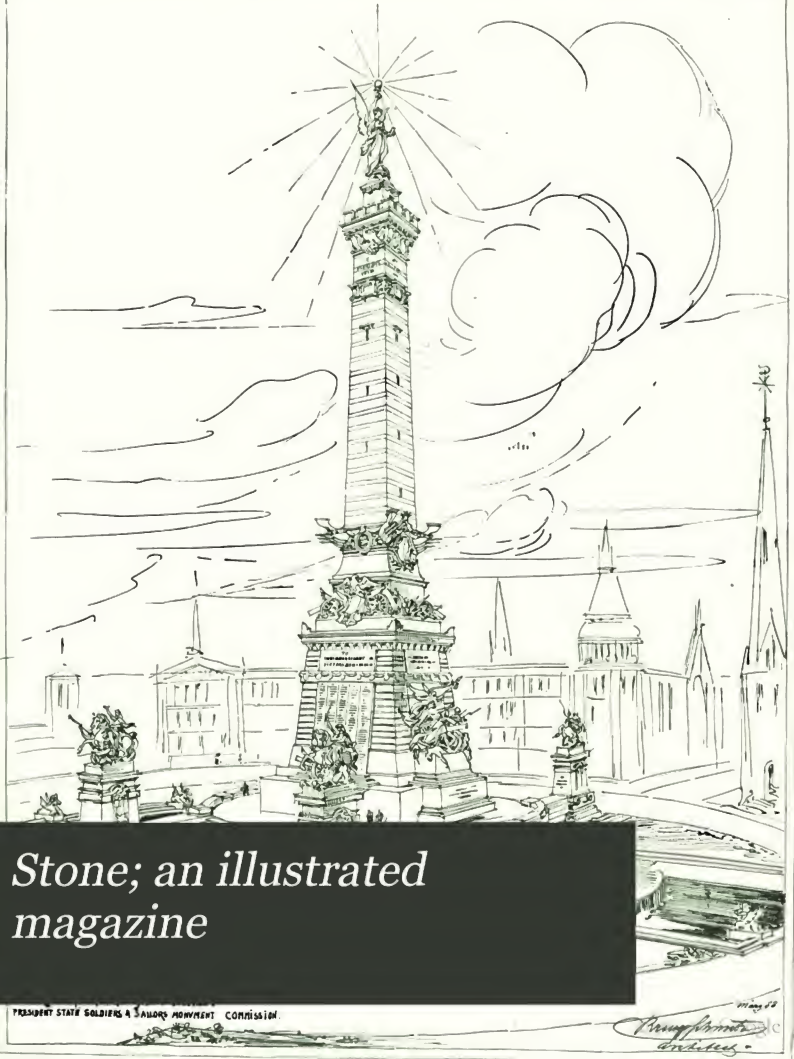
Stone; an illustrated magazine


PRESIDENT STATE SOLDIERS & SAILORS MONUMENT COMMISSION.
May 88
Bruno Schmitz
architect.

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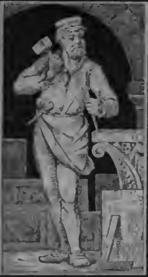

STONE

A·JOURNAL·FOR·PRODUCERS WORKERS·AND·USERS·OF STONE·MARBLE AND GRANITE

VOL. I. INDIANAPOLIS IND., MAY. 1888. NO. I.

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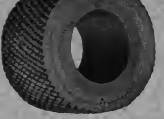

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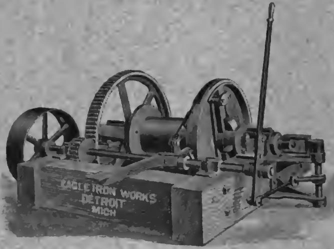

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STONE.

VOL. I INDIANAPOLIS, IND., MAY, 1888. NO. I.

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

PUBLISHED MONTHLY BY

THE D. H. RANCK PUBLISHING CO.

(INCORPORATED.)

D. H. Ranck, Pres't and Treas. A. K. Hollowell, Vice-Pres't.

Louis H. Gibson, Sec'y.

Office: News Building, near corner of Washington and Illinois Streets.

SUBSCRIPTION PRICE, - - - - - $2 A YEAR, IN ADVANCE.

D. H. Ranck, - - - - - - Managing Editor.
L. H. Gibson, - - - - - - - - - Editor.
Marcus Gardner, - - - - Manager Advertising Dep't.

OUR PURPOSE AND OUR DESIRES.

We solicit contributions of a reliable and interesting character, on technical topics.

We wish descriptive matter applying to mechanical devices which have to do with quarrying, cutting, handling and working stone; and articles relating to trade conditions.

Designs in any detail of stone working is desired, and will be presented in the best form of the printer's art and with proper credit.

News matter which would apply to any branch in our field, will always be appreciated.

We wish regular contributors from all quarrying, marketing, and manufacturing sections. We would expect such matter to treat of subjects which have local, general, or trade interest.

Contributors who wish to write for pay must make their desires known with the matter which they send. Otherwise it will be treated as general correspondence.

General correspondence is desired. This department may be made instructive, and in some instances open a way for interesting discussion. Matter of this class is always valuable to the reader, though it may treat of subjects more or less personal to the writer. This is a department where one can air his theories and expect some one else to come back at him and puncture them if they are not tenable.

We wish for publication and reference statistics, descriptive matter, record of stone tests of every stone quarry within reach of this journal, We wish information which will be of benefit to all. To the quarryman, because he makes known the material which he has to market; to the user of stone, because he may know the resources of the market may know what there is for him to buy. It affords the buyer definite knowledge as to the kinds of marketable stone. One way for the quarryman to help us get this information is as soon as he receives this paper to send us all accessible matter which he may have pertaining to his particular quarry. We would not expect to pay for matter of this class. Its publication would amply repay those interested as owners of quarries for the time used in preparing and sending the matter.

Quarrymen who desire to have their stone tested, either mechanically or chemically, can have the work done through the medium of this journal at a reasonable cost by reputable and well known experts. Parties wishing this work done may secure prices for this service on application.

Designs for tablets and small monuments will be one feature of this journal. We have arranged for designs of this class, but in addition thereto would be pleased to receive contributions from other directions. An interchange of ideas would be profitable to all alike.

We have arranged to publish all the designs of the Indiana Soldiers' and Sailors' Monument. These designs will appear from time to time as supplements, so that all who are competitors in this model competition may see and know all that was done by others.

Our department of Contract News is not fully organized at this time, and we do not wish judgment to be passed on it on this first issue. While we have no apologies to offer for our existence, or for this, our first number, we wish to say for this particular department that it was impossible to bring it up to its best in the first number. As it stands, however, it is in good shape, and is valuable, and will make money for anyone who will follow it up. In some cases mentioned the structures are merely being talked about at this time. In other cases contracts are to be let very soon. In some instances plans only are being prepared. Again, there are cases where the foundation is under way and the superstructure is not under contract. We do not make mention of any work where there is not a reasonable prospect of its going through, and endeavor to use nothing where the contracts have been let. It is impossible for us to verify our conclusions by special correspondence with the owners, for the reason that this would occupy too much time and would endanger the work being let before information could be put forth.

Our Price Current is made up from printed matter and information obtained by correspondence, directly with quarrymen. We do not wish to print any prices except under sanction of the manufacturer or producer. Information derived from printed circulars we would regard as proper matter for publication without the direct sanction of those whom they represent. We wish all information of this kind that is available.

We wish all connected with the Stone, Marble and Granite trades to bear in mind that we have established this journal *because it is needed*; that we have abundant means to make it in all respects what they desire it should be, and that *it is already a successful enterprise.*

◆

We have a three-fold object in the publication of this journal: First, to make money for ourselves; second, to make money for our patrons; third, to furnish the trades represented with a journal that shall be second to none in the universe.

◆

We have set a high-water mark at 10,000 subscribers. That number is attainable. We propose to reach it by commanding merit.

◆

Correspond with us.

THE INDIANA STATE SOLDIERS' AND SAILORS' MONUMENT COMPETITION.

As the result of a recent competition the design of Bruno Schmitz, architect, of Berlin, Prussia, was selected from among seventy others submitted. As the competition was generally satisfactory to the people at large as well as the architectural profession it may, not be out of place to say something about the methods adopted.

In the first place an act of the state legislature created a commission for the purpose of selecting a design and erecting a monument in memory of the soldiers and sailors of the state who perished in the war of the rebellion. The act ordered the appropriation of $200,000 from the general fund. The board of commissioners selected three experts to assist them in their work. These were Prof. William R. Ware, professor of architecture at Columbia College, New York; Prof. John R. Campbell, of Wabash College, Crawfordsville Ind., and Gen. Thos. A. Morris a commissioner of the state capital building, Indianapolis. Professor Ware is a well known architect, formerly of the firm of Ware & Van Brunt, architects, Boston Mass. For a long time he was professor of architecture in the Massachusetts Institute of Technology, of Boston. Latterly he has had charge of the department of architecture in the Columbia School of Mines. He is a gentleman whose high standing at once gave character to the competition in that it invited the confidence of the architects. The experts and commissioners formulated a basis of competition. They invited ten prominent architects of the country to submit sketches for which each were to be paid the sum of $200. They stated that the purpose of the competition was to assist the commissioners in determining the general character of the monument to be erected, and invited designs from the world at large other than those selected as paid competitors. They stated that the design might comprise a tower or column, a memorial hall or vestibule, with mosaics, bas-reliefs, statues, or groups of sculpture, either out of doors or within, and it is for the competitor to judge which of these features to employ, and in what proportion they shall enter into his composition.

Their specification as to the preparation of the drawings was as follows:

> These will all be drawn to a uniform scale of one-sixteenth of an inch to the foot, and finished in line with India ink with the drawing pen. They are to be black lined, and no shadows are to be cast. There is to be no brush work except in blacking windows and the sections of the walls and floors. The lettering and figuring is to be plain and simple, like ordinary printing type, and is to be confined to the names and dimensions of the rooms or other features of the structure, written in the middle of each, without explanatory comments, which are to be put by themselves, as has been said, in a separate memorandum.
>
> The perspective, also, is to be drawn in line only, without background or foreground, and without shading, even in windows.

Each drawing was to be marked with a cipher or motto but in no case was the name of the author of the design to be made known to the commissioners or experts except through the medium of a sealed envelope marked on the outside with the designating symbol or motto, and which was only to be opened after the award had been made. The author of the successful design was to be appointed supervising architect and to be paid a commission of 5 per cent. on the total cost of the work. The author of the second best design was to be paid five hundred dollars.

In due time there was a response from sixty-five architects representing seventy designs. Two designs were from Italy, four from Germany, two from England and two from Canada, the others being from the United States.

As said before, the design of Mr. Bruno Schmitz was the one selected and he was duly appointed architect of the structure. Mr. Percy G. Stone of London, England, was the unanimous choice for second place. Of the seventy designs submitted, three were thrown out on account of non-compliance with the terms of the competition. Of the remaining sixty-seven, fourteen were for a memorial hall, thirteen for a hall and tower combined, nine for a column or form of monument in combination with a hall. There were twelve others which it was somewhat difficult to class.

The following is from the recommendation of the experts, and deals with the selected and second prize designs, No. 4 being that of Mr. Schmitz, and No. 68 that of Mr. Stone.

> 1. We recommend them, in the first place, not now to appoint the author either of No. 4 or of No. 68, as the architect of the monument, since we regard the evidence furnished by the drawings as insufficient for a satisfactory choice between them.
>
> Design No. 4 is, as we have said, on the whole the most striking and brilliant of all those presented, and the scheme of a square column with cap and base is an unusual, if not an entirely novel, conception, though it has three times presented itself in this competition. Whether it would in execution fulfill the promise of his sketch depends upon the artistic resources of its author, of which such a sketch can give but slight evidence. The very boldness and originality of the scheme also lay it open, in execution, to the chance of crudeness, and the commission would hardly be justified in running this risk. Before giving the work to its author for execution they need to be assured that it will be safe in his hands. This assurance may come either from such further studies as he may furnish, or from equivalent evidence from other work already executed by him.
>
> With the design No. 68, on the other hand, the danger is of just the opposite kind. The merits of this scheme are incontestable, for they have been tested again and again for eighteen hundred years. A Roman column on a pedestal, with more or less steps and terraces beneath, has, since the times of Trajan, been the most common type for memorials of this class. It is a sure recipe, which never entirely fails, and to this it owes its almost universal acceptance. But this very commonness makes it very difficult to achieve a real success with it. Nothing but unusual personal resources of taste, sensibility and artistic power can redeem it from the commonplace. Of these qualities the sketch affords no token, as it could indeed hardly be expected to do, and it would be extremely hazardous to intrust the execution of the design to its author without knowing who he is, what he has done and what he would propose to do.

Speaking of No. 4 in another part of their recommendations the experts make the following statement:

> No. 4 also shows a square shaft. It is about half as big again in every dimension as No. 64, measuring 200 feet across the lowest step and 285 feet in height. The approaches occupy nearly the whole of the park. Four men on horseback, four groups of figures, and a gigantic statute on top, with some trophies of arms and braces of ships, form the sculptured decoration. Fountains are shown on two sides, steps on the other two.
>
> This is one of the most brilliant and striking of all the designs sent in, and shares with the preceding design, No. 64, the special quality of vigor that seems to result from the use of a square shaft instead of a round one. It is to be noticed also that the capital of a square shaft does not overhang at the corners so much as does that of a round one. It thus avoids a problem of construction which in a column of colossal proportions may sometimes prove difficult to meet.
>
> In the estimate for this monument only $45,000 is allowed for sculpture.

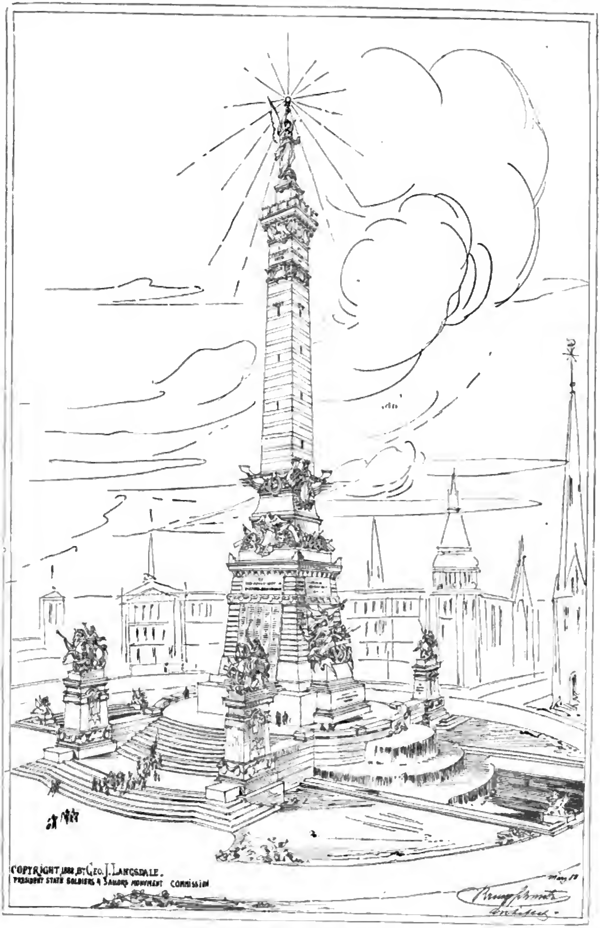
It may be interesting to note what the experts have to say as descriptive of Mr. Stone's design, which we hope to lay before our readers in a short time.

> No. 68 also shows a large Corinthian column and pedestal, 240 feet high, resting upon a high plinth, adorned with reliefs and carrying four colossal panthers, recumbent, at the four corners. Besides this there is a figure 20 feet high at each corner, and a figure 30 feet high on top. The sculptured frieze, 340 feet long, is, however, omitted from the estimate, as are also certain steps, terraces, balustrades and groups of sculpture occupying the whole park, and which, as is explained in the memorandum that accompanies the design, are only a suggestion of what may, at some future day, be added if other funds become available.

◆

PEA-GREEN AND PINK.

Close to the city of Guanajuato quarries yield a beautiful stone, which has now a clear pea-green and now a bright pink color, and which is very fine for building purposes, with the one drawback that the slabs obtained, while they may be had of almost any desired area, are but three or four inches in thickness. For columns, however, this is rather an advantage, as may be seen in the portico of the great theater now building, where the grouped pillars have an appearance almost of mosaic from the striated effect of the stone aforesaid. The market-place at Guanajuato is laid at all sorts of planes and angles, and it is a most picturesque and interesting district. —*San Francisco Chronicle.*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PRESIDENT STATE SOLDIERS & SAILORS MONUMENT COMMISSION
May 88
Bruno Schmitz
Architect

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Elegant mounted photographs of this Monument, ranging in price from 25 cents to $2.50, may be had from The Bowen-Merrill Co. Indianapolis, Ind.

MONUMENT TO AUDUBON, THE NATURALIST.

A MOVEMENT to erect a monument to John James Audubon, over his grave in Trinity Cemetery, New York city, which has been gathering strength lately in natural history and kindred circles, (originating with the New York Academy of Sciences) has shown such rapid, healthy growth that the highest hopes of success are entertained.

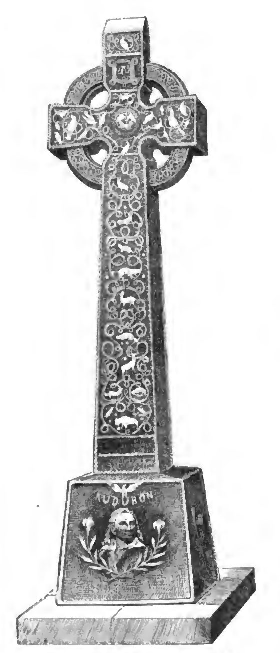
The presenting of the enterprise for the favor and support of the public, has been confided to the Committee appointed from the Linnæan Society of New York, who now issue this appeal.

We are highly indebted to Audubon for the present lofty standard of American natural history, his name has given inspiration to many, and the grandeur of his achievements in this department of science has produced a line of successors of which America is, and may well be, proud. Genius knows no national bounds, great men are cosmopolitan; in honoring Audubon, the American-Frenchman, the hunter-naturalist, the artist-ornithologist, the indefatigable and ardent lover of nature and depictor of her manifold beauties, we feel that all the world will heartily commend the project and rejoice at its successful conclusion.

The design bespeaks the work of a careful artist. It is refined and delicate in all its details. It tells the story of his work as a naturalist in the plainest possible way. Any one who sees it will know that it is commemorative of one who had to do with the things of nature.

Substantial co-operation is besought in this fitting tribute to the worth and merit of Audubon.

Contributions may be sent to any of the members of the Committee, and will be promptly acknowledged. Address, care of Linnæan Society of New York, 11 West 29th street, New York.



PROPOSED MONUMENT TO AUDUBON.

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NEW ENGLAND STONE.

A greater variety of rock is quarried within the limits of the New England peninsula than any other equal area in this country. In this respect New England resembles Old England more than the rest of America. The great variety of rock in this section has necessarily exercised a great influence on the quarry industry. Most of the rock here is the very ancient rock which was so changed ages ago by the action of heat and pressure as to present joints and cleavages which are of great advantage to the quarryman.

PRESERVATION OF STONE.

Limestones are, for many reasons, eminently suitable for constructive purposes, being cheap and easily worked, but they really absorb moisture. This, as it usually contains carbonic acid, gradually dissolves away the material of the stone, and in winter serious injury is often caused by the freezing of this water and its consequent expansion. Several methods of rendering this material less porous have been proposed, but not unfrequently the remedy has been worse than the disease. Alkaline silicates were at one time in favor for this purpose, but in its application soluble hygroscopic alkaline carbonates are formed which seriously affect the utility of the process. Moreover, unless care is taken in the application of these silicates a hard, impervious varnish is given to the surface of the stone, within which the water used in dissolving the silicates is imprisoned, and on the first frost serious disintegration takes place. M.M. Faure and Kessler have recently been at work on this question, and as the result of their experiments recommended the use of metallic fluosilicates, more especially those of aluminum, magnesium, and zinc. The surfaces to be treated are brushed over with a solution of the salt chosen, causing on the first application an abundant froth, due to the liberation of carbonic acid gas. When dry the operation is repeated once or twice, depending on the quality of stone, on an average of soft stones 1.7 pounds of solution at 40° Reaume are required per cubic yard. The advantages claimed are: That the process is completed in twenty-four hours; it allows the stone to be polished, and by a suitable choice of fluosilicate used different colors can be communicated to it; and lastly the process is cheap and applicable not only to stone, but to all cements and mortars containing lime. The theory of the process is that a double decomposition occurs, forming in the first place, silica, calcium and aluminum fluorides, and carbonic acid gas; secondly, a reaction takes place between the limestone and the aluminum fluorides, producing alumina, calcium, fluoride, and carbonic acid. In this same manner each grain of the limestone is covered with an insoluble coat, materially increasing its resistance to atmospheric influences.—*Engineering.*

EXPLOSIVES.

BASE—13TH CENTURY

In quarrying different kinds of rock there is a characteristic method employed, and this method is varied in different quarries. The texture of the rock, the structure and mode of occurrence, each influences the details of method. The cheapest method of getting stone out is through the use of explosives, but their use often so breaks the stones as to render them less valuable than when other means are used and more expensive methods are therefore employed. Where stone is used for paving, for rubble, cellar walls and ordinary dimension work, where cheapness is the first requisite, blasting is the method employed.

All quarries have a certain amount of covering which must be removed before the stone can be taken out. This deposit is either a part of the stone which has become disintegrated by the weather or is a later deposit. The first consideration in removing this deposit, or "stripping," and in forming a quarry face, is to get the broken stone out of the way as quickly and cheaply as possible regardless of its size. For this purpose no especial skill is required in the management of the explosive, but for breaking rock which is to be used, much skill and knowledge are required in order to reach the best results. Furthermore, a knowledge of the particular stone which is being worked is necessary. Every quarry has its peculiarities and must be worked according to the best method for that peculiar stone.

The use of a sudden explosive, like dynamite, is to be avoided. The effect of such explosives is to shatter the stone in many directions, as does a blow from a hammer. Coarse gunpowder is better. Repeated light charges of powder covered with sand are much better than heavy charges tamped in tight. A rock may be detached without breaking by means of often repeated light charges, which would be badly broken were a single heavy charge strong enough to detach the rock employed. Where a heavy charge is employed the shape of the bottom of the drill hole influences the direction in which the rock will split to a greater extent than does the rift. When light charges are used, the bottom of the drill hole influences the direction of the breakage, but to a less extent. Much rock has been wasted through a lack of knowledge on this point. If one examines the bottom of a drill hole which has been made with a steel bitted percussion drill, it will never be found round and a hole made with a hand drill is always triangular at the bottom. A charge will ordinarily break the rock in three directions corresponding with the shape of the bottom of the drill hole. In the sandstone quarries of Portland, Conn., they have controlled the blast very successfully by the use of the following device:

Deep holes from ten to twenty or more feet in depth are drilled with a diameter of ten to twenty inches. These holes are made by machinery and the direction of the blast is determined by placing the charge of powder in cannisters of tin, shaped according to the kind of blast required. These cannisters are placed in the drill holes and tamped in with sand so that the effects of the blast are the same as though the holes were the shape of the cannister. Where a break across in a straight line is desired, the cannister is made of two pieces of sheet tin, the edges being left unsoldered and the ends covered with paper or cloth. A horizontal cross section would show the cannister bounded by two minor segments of a circle. The blast is in the direction of a plane passing through the edges of the cannister. Where the shape of the blast is not considered a great waste of rock necessarily follows.

In most quarries where the shape of the rock is to be considered powder is only used to detach large pieces which are further worked up by means of wedges. The drill hole is put down to the depth to which the rock is to be broken and light charges of powder are employed. Afterwards a heavy charge is employed which forces the block forward. As every rock has a different structure, the direction of cleavage planes influences the management of the blast. There must be at least one free end to allow the rock to move out to the face. Where the ends are cut off by natural joints they are called "end joints;" horizontal joints, called "bottom joints" are more common.

It sometimes happens that the bottom joints occur only at great intervals. The Penryn quarries, in California are of this kind. Here they cut an underblast along the first bottom joint from one end joint to another. A line of lewis holes is put down 15 or 20 feet from the face and the blast breaks out the block between the joints and down to the bottom joint which is about eighty feet from the top. Such blasts act more like wedges than ordinary blasts and are capable of breaking off blocks containing 100,000 cubic feet of stone.

For quarrying sandstone in the larger quarries powder is not often used. Granite is less liable to be injured by the use of explosives than softer stone, but even in quarries of this class of stone, blasting is not often used except for detaching large blocks which are removed by other means.

◆

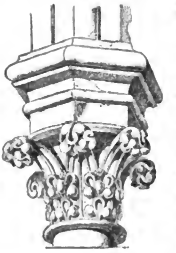
USES OF SLATE.

Slate is not confined in its use as a roofing material by any means, but, on the contrary, is probably more universally used than and other stone. In composition and texture, it is admirably adapted to the reception of carved and molded designs, is susceptible of a high polish, and possesses great power of resistance to the principal destructive elements, besides having the additional merit of wide range of colors, embracing black, dark blue, purple, purple-clouded green, gray-clouded green, light green, and a clear bright red. The scope of consumption is rapidly expanding, and among the uses to which slate is applied the following may be enumerated: Flagging, flooring, floor tiles, molding for tiles, vestibule trimmings, slabs, etc., wainscoting, mantels, hearthstones, steps, risers, platforms, sills, and lintels, turned balusters, laundry and bath tubs, sinks, and wash trays, meat and water tanks, refrigerator and cooling room shelves, cistern linings, brewers' vats, mangers, butchers' and curriers' tables, bar fixtures, billiard table beds, urinals, school slates and blackboards, counter tops, vault work, grave linings and covers, and memorial tablets. Of the above, no record of production or value can be obtained that would prove at all useful as a basis for estimates. Possibly, a faint idea of the proportions devoted to these various uses might be obtained from the production of the Slatington (Pa.) section, where, besides an output of 108,000 squares of roofing slate, there were also made (in 1885), in round numbers, 39,900 cases of school slates, 31,850 pieces, or 1,430 cases, or 27 carloads of flagging, 5,900 cases of blackboards, 30 cases of mantels and hearths, and 47 carloads of shaved slate.—*Tradesman*

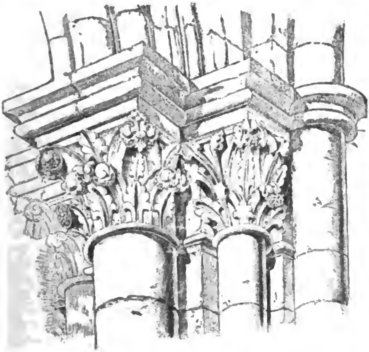
◆

Prejudice, or ignorance, or something else, has much to do with selection of building stone. Stone has been hauled 1,500 miles to Cincinnati, for instance, when in the state of Kentucky stone equally good, which has stood the test of time forty years, might have been obtained.

MEDIÆVAL CAPITALS.



THE architecture of the mediæval times presents a wealth of detail not fully appreciated by the American stone-cutter, who is prone to offer so much of his own rather than that from the artists of the olden times, rather than that which was the natural outgrowth of the Gothic architecture. We select these details rather than the building to which they belong for the reason that it is details the stone-cutter wants. An architect may deal with generalities and large masses as well as the detail, but the stone-cutter's work is essentially that of parts. Furthermore, all of his work does not come to him through the hands of an architect. A customer comes to him and wants a doorway. Has about so much money with which to pay for it. Now, this stone-cutter is not going to copy a design from a foreign cathedral as a whole. He is not going to take an entrance from France and import it by his own handicraft into an American house or church, but he may take some part for his doorway, and add value to the work he is doing. It is a good deal better to make something that is pretty and attractive for a given sum of money than it is to make something else that is clumsy, even if it has the same amount of work in it. The stone-cutter satisfies his customer. He attracts business, and he may use these beautiful features in detail as readily as anything else if he has them at hand. The examples which we here present are French Gothic of the thirteenth century.



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It is estimated that the workable area of limestones in New England does not exceed five hundred square miles. In Massachusetts, Rhode Island and Maine the area is less than two hundred square miles.

ARCHITECT SCHMITZ.

"WHO is Mr. Schmitz the designer of the Indiana soldiers' monument; what is his pedigree?" we asked of a gentleman familiar with the work of the commissioners and the affairs which have to do with the monument.

"Mr. Schmitz," he said, "comes up from the people; he is without distinguished lineage."

"Where did he study."

"In the academy at Dusseldorf, and in the office of one of the government architects. Mr. Schmitz at one time held a government position himself as superintendent of a building. He had some seven or eight years training in an architect's office, though I believe previous to this time he studied as a painter."

"What was the feeling of the commissioners when they found that they had chosen a design made by a German architect?"

"They were unanimous in favor of the design in the first place, and then it did not make much difference whom they had selected. A short time before the selection was made there was an informal conversation between Professor Ware and one or two members of the board in regard to the danger of selecting some one who might be talented as a designer, yet inexperienced and incapable of carrying out with safety and confidence so great a structure. One of the gentlemen suggested the danger of selecting a design made by a student from one of the foreign schools who, while he might have great capacity in designing, might still be incapable of a practical rendering of his work. This is frequently the case with some of the foreign students. They learn to design before they learn anything else. As soon as the envelope was opened, as was done by one of the commissioners, we laughingly called to mind the recent conversation when we noted the fact that the design was from one to him unknown."

"What did you do then?"

"Well, we read Mr. Schmitz's statement, and saw that he was a man who had done something. We wired him that his design was accepted, subject to certain modifications. He answered that he would come in March, if on receipt of his letter we wished him to come. We received another dispatch from him stating that he would come if we would send to the American Consul a check covering expenses.

"Did they do that?"

"They did more than that. They wired him the money immediately. This sharp, quick way of doing business, which was almost a shock, he started at once from Berlin to America. An American architect, who happened to be in Europe at the time, heard of Mr. Schmitz's success and hastened to meet him on the steamer which was coming to America, and sought to impress him with the importance of having some one to assist him who was familiar with American methods. Mr. Schmitz was subject to similar attacks, after reaching New York, but had the good sense to handle the business himself and to keep free from all alliances.

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NATIONAL CONVENTION OF MARBLE AND GRANITE DEALERS.

The last annual convention of the National Association of Marble and Granite Dealers was held March 2, 1887, at Louisville, Ky. The meeting adjourned to meet at Syracuse, N. Y., March 2, 1888. Previous to that time, however, the executive committee changed time and place to July 11 and 12, at Cleveland, O. There are many questions of interest which should come before a convention of this character. An interest so large as this can not but exercise great influence and power if properly organized. An industry so large as this cannot but have much which should properly come before an organized body of this kind.

RELATIVE USE OF BUILDING STONE.

It is a surprise to any one who is acquainted with the extent and richness of the quarries of New England that stone is not more used for building purposes in that region. Here where there are the finest quarries in the country, there are fewer stone buildings in proportion to its wealth and population than in any other region of equal area in the world. Most of the houses are of wood notwithstanding its considerable cost and perishable nature. In Cambridge, Mass., where there are 60,000 inhabitants, great wealth and quarries almost at the very doors, there are but a few stone buildings and not one residence of this material. Of the University buildings only five out of thirty important ones are of stone, the rest being of brick. It cannot be said that there was no stone in reach, for within ten or twelve miles there is fine stone, much of which has been known for half a century.

Perhaps the cause of this neglect may be understood when we look into the history of this section. New England was settled by a people of little wealth and less desire for elegant living. Again the country was heavily timbered and there was no knowledge of the quarries around them. Even their gravestones were long brought from England. Thus it was natural that timber should form their building material. Again, during the last part of the seventeenth and the early part of the eighteenth centuries the earthquakes were of such force as to discourage the use of even brick. The chimneys in Boston fell several times from this cause. Thus circumstances, and a lack of desire for decorative architecture led to the exclusion of stone as a building material, and habit has apparently perpetuated this neglect. That a change is coming about, we do not doubt. There is more stone being used for decorative architecture and once in a while a few stone buildings are erected. In time we may see stone used to the exclusion o brick.

MODERN EXPLOSIVES.

The composition of some of the modern high explosives, according to *Engineering*, is as follows:

Dynamite: 75 parts of nitro-glycerine and 25 of infusorial earth.

Dualine: 80 parts nitro-glycerine and 20 of nitro-cellulose or gun-cotton.

Rendrock: 40 parts nitro-glycerine, 40 of nitrate of potash or soda, 13 of cellulose, and 7 of paraffine.

Giant Powder: 36 parts of nitro-glycerine, 48 of nitrate of potash or soda, 8 of sulphur, and 8 of resin or charcoal.

Mica Powder: 52 parts nitro-glycerine and 48 of pulverized mica.

Tonite: 52½ parts of gun-cotton and 47½ of nitrate of baryta.

Blasting Gelatine: 92 parts of nitro-glycerine and 8 of gun-cotton.

Atlas Powder: 75 parts of nitro-glycerine, 21 of wood-fibre, 2 of carbonate of magnesia, and 2 of nitrate of soda.

Rackarock: 77.7 parts of chlorate of potash, and 22.3 of nitro-benzol.

It will be noticed that nearly all the above explosives are composed principally of nitro-glycerine; and it is probable that in most cases the other ingredients only act as absorbents of this liquid, and really add nothing to the explosive power. The decomposition of nitro-glycerine is practically instantaneous, and the slower-acting nitrates and hydrocarbons must be left far behind when the mass is exploded. The power of all these substances is due to the paradoxical element nitrogen, which is by itself the most neutral and inactive of all the elements, but when forced into chemical combination usually confers an element of weakness upon the entire molecule of which it forms a part.

SALT AND MASONRY.

An exchange says: One of the new building materials which is likely to be found useful in many ways is common salt. Among the carpenters salt is now found to be useful as an aid to the heating of glue. Where, as is usual in joiners' and the cabinet-makers' shops, the glue is melted in a jacket-kettle, surrounded by water, it is said to be advisable to put salt in the water in the outer kettle. The addition of salt raises the boiling point, and therefore allows the glue in the kettle to be kept at a higher temperature than could be maintained with water alone, and this is advantageous to the work. The masons find their use for salt in adding it to cement in cold weather, to preserve it from the bad effects of freezing. It is not quite clear why salt should act in this way, as the beneficial results of using it are visible with mortar which has certainly been frozen, and frozen salt water expands nearly as much as fresh water, but engineers and contractors who have tried it are unanimous in their opinion of its value. In many cases masonry has been laid in cement in cold weather, using a considerable proportion of salt in the mixture, which after repeated freezings and thawings, has remained in perfect condition while work near by laid in mortar of the same kind, but without salt, has been disintegrated by the frost.

THE BUILDERS OF THE PYRAMIDS.

A personal inspection of the pyramids of Egypt made by a quarry owner, who spent some time recently on the Nile, has led him to the conclusion that the old Egyptians were better builders than those of the present day. He states that there are blocks of stone in the pyramids which weigh three or four times as much as the obelisk on the embankment. He saw a stone whose estimated weight was 880 tons. But then the builders of the pyramids counted human labor lightly. They had great masses of subjects upon whom to draw, and most of their work was done by sheer manual labor and force. There are stones in the pyramids thirty feet in length, which fit so closely together that a penknife may be run over the surface without discovering the breaks between them. They are not laid with mortar, either. There is no machinery so perfect that it will make two surfaces thirty feet in length which will meet together in unison as these stones in the pyramids meet. It is supposed that they were rubbed backward and forward upon each other until the surfaces were assimilated.

A NEW EXPLOSIVE.

Ex-Lieut. Graydon, of the navy, and a party went to the stone-quarries in Decatur county, Indiana, recently to experiment with his new explosive, which he calls "Graydonite." The tests were very satisfactory. A ledge stone blown out with a charge of the explosive (one and a quarter pounds) measured 45 feet wide by 110 feet long and 10 feet deep, sufficient to make five car-loads of debris. The explosive was duly measured and charged, used the ordinary waterproof fuse and detonating caps. The practical miners present say the result was marvelous, being from four to six times greater than that produced by the same quantity of dynamite fired immediately afterward in a corresponding ledge of granite. Other tests are promised in the near future.

STONE BULLETS.

In 1418, 4,000 bullets were ordered to be made of stone from the quarries of Maidstone, England. These were for cannon. Iron bullets were made for the same purpose in 1550.

New York contains a greater number of stone quarries than any other state. Ohio quarries more stone than any other state.

[Contributed.]

THE MARBLE BUSINESS.

A. A. M'KAIR.

NO business has made greater progress in style of finish and material used, and in everything that goes to show progression, than has the tombstone or monument business, in the past few years. Scarcely twenty years ago the two-inch slab was the standard tombstone. The wealthier customers purchased taller and broader, and sometimes thicker slabs than their poorer neighbors, but the slab with a stub end in the ground was all that was offered and consequently all that was sold. It is curious to note the evolution that has been going on since that time. Of course some good monuments were sold in some of the larger cities at all times, but the standard was not very high. The next step was the shaft. From the little fellow not more than six inches square and two feet high, on up, the design was the same, varied only by an additional base, die, or cap. The change, once having set in, progress was rapid. From the shaft to the tablet and cottage monuments with their endless variations and combinations of statuary and sculpture, to the beautiful sarcophagi and mausoleums, the trade and the public have hastened step by step until those who were a few years since the heaviest dealers, and who failed to catch step to the music of progress, find themselves without business or patronage. This progress has not been confined to the cities. Everywhere it is the same. Not more than ten years ago a few stock photographs from some of the Vermont quarries was all that dealers had to show their customers. Now in almost every marble house in the country will be found, not only good and varied photographs from all the wholesale marble houses, but good photographs procured from the best cemeteries throughout the country, besides their good collections of hand drawings, and the effort to get something new goes on continually. A business or trade that shows such improvements, and dominated by such a spirit, is not in its dotage.

The marble men have been taught to think too little of the dignity of their business. They have looked too much at the faults of their competitors and have not been generous enough to their many good qualities. In short they have not permitted themselves to become acquainted with one another, and thus allow mutual contact to polish the better qualities of each. For such contact and acquaintance, associations among men are formed.

Nothing is more patent than the fact that he who would become quick-witted self-confident and able to take care of himself must mix with other men, and by the polish of mind against mind, get the lustre desired. And, of course, no society is so necessary to any trade as the society of our fellow tradesmen. Something new is always to be learned of each other hence the gain is mutual.

It is not the purpose of this article to advocate any particular cause nor to appeal to the dealers to unite with associations. The only purpose is to note the improvements made in designs of monuments and methods of doing business, and thus to encourage the progressive business man, and we only offer this suggestion that social contact with our fellows will beget further improvement.

What has become of the lugubrious tombstone peddler? We mean the fellow who attended all the funerals, went home with the widow, gained the good-will of the parson (was he not generally a broken-down preacher himself?) and ended by taking a contract for a slab, or headstone the day of the funeral? We have buried him, or the most of him, and those who are left are like the slabs they sold—they are leaning over graves ready to fall into them. What has become of the man who has wasted his time trying to prove how much cheaper he could build work than his neighbor was doing it? Well, it must be confessed that he is not dead yet, but the next trip of the fool-killer will catch him, and if the trip is long delayed, starvation will do the work. He is a companion of the vulture type. When they die there will be no slab at the head of their grave - perchance a bunch of weeds.

What has become of all the so-called carving with which we were once so familiar? Where are all the impossible fat lambs, the billing turtle-doves, the weeping-willows and the clasped hands? Does anybody mourn their loss? One man seems to, he who puts skinned work on blue marble, but even he can console himself. He will soon follow the man that carved the weeping-willows, but we would not wholly condemn him, his work, transient and perishable as it is. Many of his designs are tasteful, and even cheerful. Much of the work done in granite and marble now is good, so good that it is worthy of the place assigned to it by nature. Do you workers in stone always think of the durability of your work? Do you remember always that when the great iron steamships lie rotting in the bottom of the sea, when the telegraph, the railroad, the cotton-gin, the sewing-machine and the thousand and one fabrics of metal, wood and fiber that go to make up material progress have become dust and rust, and disappeared from the face of the earth, when the past, present, and future history of man as we know of him in literature has perished and been lost for ages, that your work will be unearthed by antiquarians of future centuries, and the curious marks: "John Jones, Born April 1, 1842; Died Feb. 29, 1888," will be studied, commented on and possibly deciphered, and that by your work, and yours only, will the civilizations of the age be judged? The opinion of these antiquarians may not have any effect upon your trade, but work which is so enduring is worth well doing, and if well done will pay you. It behooves every man of us to seek to improve his designs and his work, and if this is gone about carefully and systematically, there will be as much progress in the next ten years as there has been in the past; and if that result is attained, there will be as much profit and honor in our business as can be gained in any other honest calling.

PORPHYRY.

Porphyry is an almost indestructible rock, withstanding for ages the effects of the weather without appreciable change. It presents many differences of color, the most common being whitish, flesh colored, red, blue-black, black and green. It is a very fine grained, compact rock taking a high finish. It seems a pity that a rock so desirable should be so difficult to work. It presents no stratification and is so hard that it is impossible to take from the quarry except in small, irregular blocks, and is even then handled with great difficulty. Chemically porphyry is not different from granite, and mineralogically, it differs in the fineness of texture more than otherwise, and in containing crystals of quartz or of other elements. The quartz porphyry from Fairfield, Pa., shows large quartz crystals imbeded in a finely compacted mass of quartz and porphyry which are so finely divided as to be inseparable even with the best microscope. A specimen from Stone Mountain, Missouri, shows crystals of orthoclase instead of quartz, and the surrounding mass is granular in structure. It is supposed that most porphyries are of eruptive origin as is lava, but those around Boston are supposed to be of different origin, having been sedimentary deposits changed by heat. Porphyry is little used for building in this country, owing to the difficulty of handling it. In Great Britain it is used for roadways, being especially useful for this purpose on account of its toughness and hardness.

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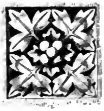
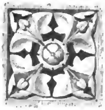
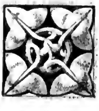
The custom-house reports show the importation of stone into the United States from nearly every country in the world.

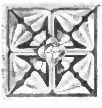
ROSETTES AND PANELS.



IT is just as easy to carve an attractive and beautiful design as it is to carve something that is ugly. It would occur to us that it is often in the minds of those who are engaged in the various details of building and constructive work that it is essentially cheaper to make an ugly thing than it is to make something that is really attractive and beautiful. In truth, a pretty thing is more a matter of wit than of money. Here are some examples of small, square panels in stone that are simple in design, yet elegant and attractive in every detail. They are from the conventionalized forms of Mr. Colling, who takes a natural form, a piece of foliage, and uses the ideas suggested in a constructive way in carrying out a design. He does not undertake to make his leaves look as though they had been plucked from the tree, for if so why not paint them green? But he uses the leaf form in a stone way, and arranges it possibly on geometrical lines, and while we have something which we recognize, we also have something that is not presumptious. We have said that it is just as easy to have a pretty thing, and just as cheap, as it is to have something ugly. If a stone cutter has a little square panel to fill, why not do it with something of this kind rather than with one of the old ugly things that means nothing, is essentially clumsy and gets worse through constant repetition? Why not take the design from some one who has made it his business to collect and arrange new and beautiful things rather than something that is old and timeworn, and at the same time essentially ugly and unskilled. The illustrations which we here give we would judge to be illustrative of our idea.







PAVEMENTS.

In the paving of streets in twelve principal cities, one hundred and fifty millions of dollars have been expended. It is fair to say that a large portion has been wasted, as an inspection of the streets will indicate. It is not usual for a city to repave a street two or three times in ten years. Large sums of money have been wasted in wood pavements. There has been sufficient experience in the matter of pavements, so that experiments are not in order. The cheap pavement is the expensive pavement. It is this strange god that all are after. The high-priced pavements of this time are the cheapest in the end. Stone pavements can be made which can be maintained with very slight expense. The old wood pavement was high-priced, and millions of money were wasted on it. The stone block pavements and the macadamized roads are generally recognized as the standard roadway of the present time, though it is well known that their use will not be universal for some time. In the end, however, there is nothing so satisfactory. It is the only pavement that any community can afford to use. It is the cheapest in the end. The "asphalts" have followed the wood pavement, as something alluring, but unsatisfactory.

The first stone quarried in New England were the syenites near Boston, and the sandstone of the Connecticut valley.

PRONOUNCED UNTRUE.

John J. McDonnell, an ornamental marble worker, a modeler, and carver tells a Chicago *Tribune* reporter of his political troubles in Humboldt, Tenn. He says he went to that town to work at his vocation, and that on one occasion he was met on the street, and in response to a quiet salutation to Albert Dodson, a bank cashier of Humboldt, he was roughly answered, and that Dodson subsequently said that he would put a bullet through the "d——d northerner," meaning McDonnell, and adding in effect that he was a Northern political spy, who was there for the purpose of collecting political information, etc. Subsequently it became generally believed about the town, so Mr. McDonnell states, that the above statement was correct. One of the charges made against Mr. McDonnell was that he read Northern in preference to Southern papers. The account recites that Mr. McDonnell was induced to go to the theater as a part of the plot to kill him; that he heard statements while there which confirmed this suspicion, and that but for the fact of his giving the plotter the slip he would have been hanged. It is further related that in his place of concealment he heard a great deal that made him certain of the evil intention of his pursuers. The next morning he took the train for the North. He says:

> "I received a note, delivered by a colored boy, April 12 or 13 stating that I must quit taking that Northern paper (meaning The Chicago *Tribune*, which I had taken since the latter part of March) or I would die. I paid no attention to that note, of course. I heard them say Friday night, I believe, that if McDonnell is put out of the way there will be five or six of his friends to go with him, for if the Northerners get hold of it those damn Yanks will be down here again, as they were in 1861."

On April 17, Mr. McDonnell was in Chicago.

The following is from the Humboldt (Tenn.) *Messenger*, of April 20:

> The long story of the outrage of J. J. McDonnell in another column every person in and around Humboldt knows to be a malicious lie from beginning to end. It is an insult to the people of the whole South. McDonnell has always been treated as a gentleman and not a person in town ever had a word of trouble with him about politics or anything else. Last Friday a woman who gave her name as R. Meiler, arrived in town. She asked a number of persons if McDonnell had represented himself as being a single man, and led them to form the impression that he had deserted her. He appeared to be afraid of her and would not go to his boarding house. They were seen talking together by several persons. On Friday night after the circus he went to Mr. Spary's boarding house and got into one of the boarder's beds, acting strangely. He left town on Saturday morning. The young men whose names have been used by this scoundrel have consulted attorneys, and will institute suit against the Chicago *Tribune* for criminal and malicious libel, claiming damages to the extent of $50,000 each.

We have received the following from Stewart & Melnotte, marble dealers, of the above-named point in connection with printed circular giving the facts as abov set fort.

> "In justice to our town and state, and to us as well, depending largely as we do on Northern mechanics, we ask that you copy entire in first issue of STONE. If desired will forward any amount of proof as to falsity of McDonnell's assertion, by lifelong Republicans."

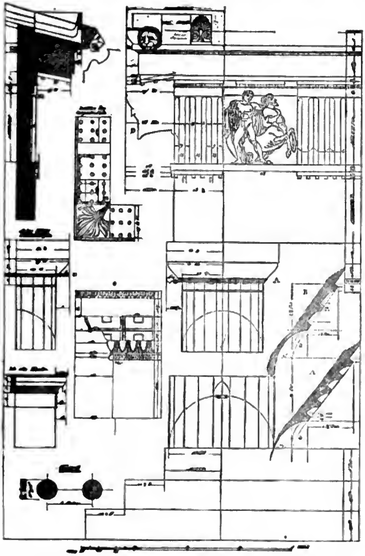
RAPID BUILDING.

One of the largest and most successful builders in this country owes his success to his ability to devise and put in operation mechanical devices for the rapid handling of stone, and other heavy material about a building. He takes contracts at figures only slightly below those of his competitors but is enabled to make large sums of money out of his work, entirely owing to the fact that he has a large plant for pushing his work. Especially is this true in the handling of stone about the building. There are no laborious processes of lifting done by man power and derrick, but all this work is done by steam machinery. Where the building is not too large, he locates the boiler and engine in a central position so that the drum may be connected with any of the ropes running to the various derricks and elevating apparatus. He is particularly successful in the arrangement of run-ways above the walls which facilitate the rapid handling of stone in a horizontal direction

THE GREEK DORIC ORDER.

HEREWITH we present a drawing in detail of one of the Greek Doric orders. It is a veritable example from the Acropolis at Athens, carefully measured and reproduced. Our cut does not show all of the figures and dimensions plainly, but any one who has enough interest in the study of the orders to look into it carefully will have no difficulty in deriving full benefit from its study and reproduction.

In this matter of the orders we have to say that no design either in architectural work, or in that closely allied branch of architectural work monumental designing can hope to meet with any large success without having a full knowledge of the different orders of architecture. They are the foundation of all designs, and no one can hope to succeed in any large way without being thoroughly ground in these principles. This is positive.



In all of the best schools of design where architectural or monumental work is taught the students are required to so thoroughly understand the orders as to be able to draw them from memory.

A great many of the details of monumental as well as architectural work are atrociously bad, for the reason that the designers are unfamiliar with the foundation principles of monumental designs both as to substance and detail. No one can design or properly draw a molding who is not familiar with the different orders of architecture.

With the idea in view of familiarizing those who care to study this branch of the work, we will present from time to time the different orders of architecture as reproduced from the best examples on a scale of sufficient size to make the work of reproduction more satisfactory than will be the case with the drawing which we here give. We may say that the only way for a student to familiarize himself with this branch of design, is by making copies of the different orders.

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INCOMPLETE INFORMATION.

There is sometimes a disposition on the part of those who publish trade journals to cater to one branch of the trade rather than to work for the general good. We have in mind an instance where the cost of manufacture by wholesalers was stated for the purpose of giving the retail dealers a chance to make a closer deal. This sort of thing can only make trouble and contention, and does no good. The retail dealer we will say gets this information as to the cost of manufacture. He says: "This represents your cost; I will pay you only so much." Here is a contention on the basis of a misunderstanding. The cost of manufacture does not fix the cost of producing. If we were to give prices of the cost of stone cutting and working in any branch of business, we would in effect give only the cost of one detail of that business. There are many matters outside of the actual cost of working to be considered. For instance: Interest, depreciation of plant, expense account, insurance, waste, office expenses, which, by the way, are always fully considered by those outside of the manufacturing business, and many other things. The knowledge of one detail of manufacture is like a little knowledge—it is dangerous. Competition makes prices. If the buyer has the advantage, he uses it. If the seller has it, it is for him to make the most of it. Say the demand is greater than the supply to the retailer. What is his knowledge of the total cost of production going to do for him in that event? The wholesale dealer will say: "What are you going to do about it?" On the other hand, if the retailer has the advantage, he buys regardless of cost. We cannot see that publication of all costs would be harmful to the wholesaler, nor do we see that it would be of advantage to the retailer. We can see that incomplete knowledge would be embarassing, if not harmful, all around. There is one way to get the best prices, and that is not by prying into costs. It is by competition. It is our intention to publish such prices as are furnished by dealers, either direct, or by printed circulars for the trade. These, as may be known, are subject to varying discounts or not, as the dealer may elect.

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THE WAY PORTLAND CEMENT IS MADE.

Portland cement is an artifical product, chemically proportioned by the proper selection of the material entering into its composition. These, whether chalk or clay, as in England, marl or clay, as in Germany, or hydraulic limestones, as in this country, are in every case reduced to the finest powder by either wet or dry grinding, and this powder moistened merely in the dry process, or in the form of paste in the wet process, becomes practically, either by drying in large tanks or by being moulded into bricks, eggs or other forms, a new stone, into which all the elements are brought in close contract and are in perfect chemical proportion. The artificially-made new stone, burnt, as it is, at high heat in close kilns, has every element chemically active, and the clinker represents practically, when properly proportioned chemically, a composition of bi-basic silicate of lime and aluminate of lime. This ground clinker is the Portland cement of commerce, a fixed uniform product, sold under a warranty of its strength and firmness, and depends upon the controllable elements of skillful manufacture for its character and uniformity.

GRANITE.

STONES which are known, commercially, as granite, are divided by the mineralogist into several classes. This division is made on account of the way in which the rocks were supposed to have been formed and as well as from some differences of structure. Chemically they may be essentially the same.

Granite belongs to the oldest known rock. When the earth was cooled from its liquid condition granite was formed and is known as primary or igneous rock. It is the foundation upon which all subsequent rock was deposited. Thus granite differs from the rock which was formed later in lacking stratification. In cooling it formed a solid mass, while later rock was deposited upon it, a layer or strata at a time, and we only know of the existence of granite through its being thrown to the surface in one of two ways. When the earth had become partially cooled and unknown ages had deposited numerous other rocks over this granite foundation, interior disturbances caused the upheaval of large parts of the earth's surface and large masses of granite were exposed. Thus we find granite at the top of the mountains. Stone exposed from this cause is known to the geologists as true granite. It was brought to the surface in a cooled condition as we find it now.

Under the mass of cooled granite there then existed, as there perhaps does now, a mass of molten material of uncooled granite. At various times this was forced to what was then the earth's surface through the rocks which had been deposited upon the cooled granite, and poured itself in a molten state to be cooled where it lay. This process is repeated to-day in volcanic eruptions of lava, the only difference being that lava and this uncolored granite are different in composition. Or, this molten material was forced between the layers, where it cooled and was subsequently exposed to view, by the wearing away of the layers above it. This rock, which was thrown out in this molten condition, is known to the geologist by several different names, the rocks being divided according to their coarseness or fineness of structure, and variations in crystallization. Still it is chemically the same as granite and is known to the commercial world by this common name. All these primary rocks which lack stratification, the similarity of whose appearance makes them applicable to the same uses, which are of nearly the same hardness and presents the same difficulties in cutting, dressing and polishing are known to the commercial world as granite.

The essential elements of true granite are quartz and potash feldspar, with these may be found other minerals which vary the condition and appearance of the stone. But quartz and feldspar are the only elements absolutely necessary to granite. The other minerals help to make variations in the stone. When the earth was in a semi-liquid state, when it was in the process of cooling or solidification the quartz, was, through some unknown agency, rendered more susceptible to the action of heat than the other elements and thus cooled less rapidly. This is proved by its having filled all the interspaces left after the other ingredients had crystallized. Thus quartz acts as the cement.

It is to the feldspar and other ingredients that granite has its diversity of appearance. Feldspar may appear in four or five different species, which are different in color, and when two or more of these species are found in a single granite the coloring is strikingly manifest. Of two or more kinds of white feldspar one may be opaque and the other transparent, or one opalescent and the other dull. Most of the striking characteristics and a large proportion of the immense diversity of granite rocks, is due to the differences in the feldspar. The structure of the feldspar influences the quality of the polish which may be imparted, the ease or difficulty with which a stone may become discolored or stained, and the resistibility to decay. The study of this constituent is the most important in the consideration of granite. Feldspar influences the cutting of the stone as well as its shade of color. The hard granites consist of quartz with a transparent, compact, nearly glassy feldspar which is quite difficult to cut and which allows the light to enter it and be absorbed, thus giving the stone a dark color, as in the Quincy granite. The hardness of granite is not so much due to the quartz as to the feldspar. Quartz is always brittle and not very variable under tools. In soft granites the feldspar is porous and less resistant to the tools. These granites reflect the light and give the light or white color to the stone. The Concord granites may be mentioned as an example.

It is well known that granite is readily affected by heat. This is due to two causes. The different constituents expand differently when exposed to heat and thus force the stone apart. Again, the microscope shows that quartz contains many pores which are filed with water. About eight-tenths of one per cent. of water is found in granite when fresh. This water when heated, tends to explode the pores and helps disintegrate the stone. Quarried granite may absorb more water than it contains when fresh, by the filling of the empty pores and rift in the feldspar.

Quartz and feldspar at times form the whole of the granite rock, but at other times the accessories become very prominent and give the various characteristics. The most common accessory is mica, which may occur in four different forms, and any two or three of these forms may appear in the same rock, giving rise to many varieties of what is call mica granite. References will be made to the most prominent of these varieties. The amount of mica present is economically important. It does not polish as readily as the quartz and feldspar, being softer, and when polished does not retain the lustre as long as other stones, becoming dulled by exposure. It is, therefore, not so valuable for use where a high polish is desirable.

Where the mica is of that variety known as the muscovite, the granite is known as the muscovite granite. Muscovite is nearly white and the granites containing it are very light or nearly white as those which are found at Barre, Vt. This granite is of a coarse texture and from light gray to almost marble whiteness in appearance, the mica giving it the whiteness. There is a fine gray granite of this kind quarried near Atlanta, Ga., which is of a very even texture.

The second mica granite which we mention is biotite granite. This is by far the most widely spread of our granite rocks and presents the most diversity of color and structure. A large proportion of all the granites quarried in the United States are biotite. They vary in color from black to dark and light gray, according to the amount of mica they contain and the color of the feldspar. Many of the red granites also belong here. As a rule these granites are harder and tougher and of more even texture than other varieties, if we except porphory. The texture however varies greatly and those from one section cannot be considered as typical of the group. The granites from Dix Island, Me., Westerly, R. I., and Richmond, Va., may be considered as nearly typical as any. As far as known the porphyritic granites are biotitic. That found in East Bluehill, Me., is a fine gray rock, the uniformity of the texture being broken by snow-white crystals.

The muscovite-biotite granite combines the qualities of both muscovite and biotite granite, and may be considered as intermediate between the two. That from Concord, N. H., and from Allenstown, Sunapee and Rumney are of this variety.

Hornblende granite is one of the best and toughest granites which we have. Hornblende is easier to polish than mica, and for this reason this granite is desirable. It owes its toughness in many localities to the kind of feldspar contained, it being orthoclase, the hardest and toughest of feldspars. The new Mormon temple is built of hornblende granite. There are numerous quarries of this granite in Massachusetts, Maine, two or three in Minnesota and some in New York.

Hornblende-biotite granite is intermediate between hornblende and biotite in composition and properties.

Epidote granite is found only in Dedham, Mass. Epidote occurs in small quantities in many granites but that in Dedham is the only one in which it occurs in sufficient quantities to give character to the rock.

Syenite is quarried to a very small extent in the United States. It is granite in which the quartz is absent, or so small in quantity as to be only an accessory. Syenite may occur in as many varieties as true granite, depending upon the quality of the feldspar, mica, hornblende or other element which gives it character.

When, by some movement of the earth's surface, a stratification was given to the granite rock it is known as gneiss. Sometimes this stratification is so slight that it is difficult to discover.

It is impossible to determine the line between gneiss and true granite. Many of the most extensive quarries in the United States, which ostensibly quarry granite, really produce gneiss. It is known to the quarryman as "striped" or "bastard granite." There is no use to which granite is applied for which gneiss may not be used, and for some purposes the stratification renders it more useful. It is obviously easier to quarry, especially when the stratification is distinct. It occurs with all the variation of true granite, depending upon the varieties of the accessory minerals for its character.

Mica schist differs from gneiss only in lacking feldspar, it having the stratifications of the latter rock. It is also sometimes called "striped" or "bastard" granite.

Diabase differs from granite in having no quartz and in containing a different kind of feldspar. Under this name is included most trap rocks, or what is known to the quarryman as "black granite."

PRESERVING STONE.

About a year ago I watched with great interest the operations of the workmen on a building devoted to the manufacture of candy in this city. The building was brick, and the men were engaged in holding little charcoal furnaces about a foot square against the outside walls. They went over every square foot of this building and it was five stories high by about seventy-five feet deep—holding the glowing coals against the brick sides. My curiosity on the subject was somewhat aroused, and upon inquiry I found that it was a new process for preserving brick and making it impervious to the storms of winter. Now I find that the same process is being used on the obelisk, and that these little charcoal furnaces are burning the sides of Cleopatra's Needle from the base to the apex. This famous stone, that has stood the storms of centuries in Egypt, was beginning to succumb to the curious climate of the United States, and fears were entertained that a few more winters would make serious inroads upon it; but some one suggested burning it with paraffine, and it is now being done. The heat is so intense that it is burned in for a full inch; then when the stone cools again it is as hard as adamant.—*New York Letter.*

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The harbors along the coast of Maine are numerous and deep so that stone can be readily and directly loaded to vessels. This makes this region favorable to a large quarrying industry.

ACCEPTED DESIGN OF THE INDIANA MONUMENT.

IN this issue of STONE we present the accepted design for the Indiana soldiers' and sailors' monument at Indianapolis. The design is taken directly from the drawings of Mr. Schmitz as modified by him since the close of the competition. A comparison of this design with the one submitted in the competition will show several changes in detail. For instance, the high pedestals near the sidewalks have been added. In the original design the groups shown were placed upon emphasized buttresses at each side the steps. It may be well for us to state before going farther that this monument is located in the center of a circle 333 feet in diameter. This circle being a part of the original plat of the city is surrounded by a wide street which connects with two of the important streets which, but for the Circle Park, would intersect.

In the original design the space now filled by the large tablet was occupied by a doorway. In this respect we would say that the original design is superior to the later one. The idea of the battered base, the emphasis given to it by the horizontal stone lines and other rigorous features as a part thereof, indicates that it is a part of the support of the square shaft above. The fact is it is not. The shaft continues down through the large battered base and rests upon a foundation of its own. The appearance of the modified design does not convey the impression. In that respect it is a false impression, and hence the means are not so worthy as if more truthful. The placing of the doorway in the face of the monument suggests that it is not a base in the sense of a support, but merely a pleasing and useful form.

We understand, however, that this and many other details are to receive careful attention from the architect and commissioners before the working drawings for the superstructure are finally made and approved. For instance, it is suggested that the curve immediately above the sculptured portions of war emblems above the battered base is somewhat soft, and altogether weak for so great a beginning. Furthermore, that the location of these war emblems in their irregular position and forms present a confused outline which is hardly in keeping with the exactness and clearness of the other portions of the structure. Taking the design as a whole it is a wonderful success. It is exceedingly dramatic in character, wonderfully picturesque, and altogether very beautiful and imposing. Withal it is a novel composition, so novel indeed, that the experts had to say: "The very boldness and originality of the scheme lays it open in execution to the chance of crudeness." This statement was made when they were without knowledge as to the author of the design, or the history of his work. From subsequent knowledge it appears that this risk is not great. Mr. Schmitz, though a young man, not more than thirty years of age, has been very successful as an architect, and notably so in monumental work. He was the successful competitor in the Victor Emanual Monument of United Italy, a structure to cost between five and six million dollars. He has been successful in some forty competitions.

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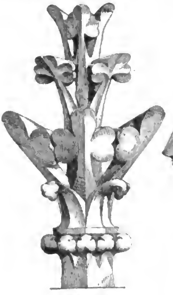
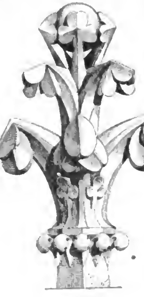
There are a few stone quarries in the state of Florida. At Hawthorne is a stone composed almost entirely of silica, of a quality suitable for glass making. It has been used in the state for building chimneys for over thirty years. It is very soft when quarried, but rapidly hardens. It can be cut with a hand-saw. Two men may cut 1,500 bricks of a size 4x8x16 inches in a day.

One of the large halls of the National Museum at Washington has been set apart for the exhibition of a collection of building and ornamental stones. Each sample is placed under a suitable glass case with proper background.

FINIALS.

THESE two designs by Mr. J. K. Colling are self-explanatory. "Morning" and "Evening." The forms are conventionalized clover leaves, beautiful and clear in outline, and adapted to stone construction in an easy, natural, straightforward way. Nothing could be nicer than to put something of this kind on a pair of Gothic gables—"Morning" to the east, we will say, and possibly "Evening" to the west. There is just enough sentiment about this idea to make it attractive. In construction there is nothing forced about it. There is no exact imitation of clover, but merely a clover form which acts in a suggestive way for something which is pleasant to look upon. There is no stone clover. It is merely an attractive clover form in stone.


MORNING.


EVENING.

A BEAUTIFUL RELIC OF THE MOUND-BUILDERS.

Workmen while removing the earth from over Watson's stone quarry at Alton, Ill., recently came across a number of relics of the Stone Age of unusual interest. One singular carved stone is the exact imitation of the deep hull of a ship or boat. The stone is a peculiar metamorphosed slate, and made up of alternate white and black lines like carnelian, and these lines, gracefully curving from the prow along the side of the hull, have exactly the appearance of a vessel's planking. The pretty relic is about five inches long and a perfect gem of art, highly polished, and sits the water as gracefully as the hull of any sailing yacht. Each end of the vessel rises into a sharp prow, through which is a perforation by which it was, probably, carried on the person of some ancient mound-builder, chief or ruler. How such a stone could have been fashioned, especially how the inside could have been scooped out so successfully, without the aid of a lapidary's tool, is a mystery. Professor McAdams, who has the relic, says that these peculiar "badge stones," as they are called, are the most interesting of all the mound-builders' treasures. They were evidently sacred objects worn only by leaders or rulers. They are not uncommon in the great earthworks of Ohio, Indiana, and Southern Illinois, but are seldom found elsewhere. The professor says it is not clear to archæologists what was intended to be perpetuated by these unique and beautiful ships of stone. Probably something in connection with the origin or migrations of the strange and unknown people who built the great earthworks in the bottoms between Chicago and St. Louis.

SLATE.

The following are excerpts from the address of W. B. Lord, read before the Chicago Architectural Sketch Club, February 13, 1888:

The early history of slate is obscure. I have been able to trace its use only to the thirteenth century, when the quarries of North Wales furnished slate for the roofs of the old historic castles of Conway and Caernarvon, which were erected about 1300 A. D.

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Enterprising Americans with an eye to business are taking advantage of the gradual failure of the Welsh quarries, the present obstacles which are retarding the development of those of Ireland, and also of the fact that although it is quarried at many points on the continent—only the local trade can be supplied—are shipping large quantities to foreign countries.

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The principal slate-producing regions of the United States are Rutland county, Vermont; Washington county, New York; Lehigh, Northampton and York counties, Pennsylvania; New Canton, Virginia; Monson, Maine, and Baraga county, Michigan. Workable deposits are known in other localities, but at present they are inaccessible.

The first quarry in Rutland county, Vermont, was opened about the year 1840, and in Washington county, New York, about 1850. In these two localities are found our red, green and purple slates. The remainder of the localities produce the black and the blue-black. Slate from Lehigh and Northampton counties, Pennsylvania, is known to the trade respectively as the Lehigh and the Bangor. The Lehigh slate is quarried at and in the vicinity of Slatington. Bangor, Pen Argyl and Chapman's produce the bulk of the Bangor slate.

A preference is shown (I suppose on account of price) for the Bangor, and more No. 1, as they call it, is specified than can be supplied for roofing. Through inattention and inability to distinguish the difference, a great deal more of No. 1 Bangor is paid for by the consumer than is used.

The York county, Pennsylvania, quarries produce what is commonly called "The Peach Bottom" slate. They were opened about eighty years ago, which may be stated as about the date of the commencement of the slate industries of the United States. This being undoubtedly the best slate in this country and the demand for it so great, the production is now limited and but little on the market, as the quarries are too deep to profitably work. Near New Canton, Virginia, lies comparatively inexhaustible deposits of most excellent slate, which is fully the equal of the "Peach Bottom." T quarries have been extensively worked for years, and are equipped with a necessary machinery, planers, saws, rubbing beds, etc. The toughness this slate makes it more expensive to work than the softer varieties, but t extra quality of both roofing and slabe slate produced by this quarry wi more than repay the small extra cost.

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In the selection of slate as well as building stones, care and judgme must be exercised, as a vast quantity of worthless material is on the mark True slate or slate of commerce may be defined as a fine grained, compa and exceedingly fissile (ready split) mineral, varying in color from black dark blue, purple, shades of green, gray and brick red. It has the propert of being hard without being brittle, and capable of resisting a pressure about 20,000 pounds to one cubic inch without crushing, or it may be so and tough. When free from impurities, it is a non-absorbent of water, a does not disintegrate in the air. It is capable of sustaining a high degr of heat without fusing or cracking, and can be readily carved or turne It is easily worked and takes a smooth finish. By the marbelizing proc it is coated in an unlimited variety of colors, imitating marble for mant work; and the hard wood for matching trimmings, decorations, etc., for i terior woodwork. The different colors of slate are chiefly due to the vario proportions of the compounds of iron in its composition. It is present ordinary blue slate as protoxide of iron, an excess or lack of which and t absence of peroxide of iron' is the cause of the many different shade blue. If the slate be of good quality and ring, and the color rich deep b or black, and of uniform shade, it will not fade and is durable. In green slates the proportion of protoxide of iron is one-third less tha blue. Traces of phosphoric acid and magnesia in combination wit oxides of iron, produce the green shades. The unfading green has a l proportion of the peroxide of iron and calcium carbonate, and less of nesia than the sea-green, and therefore, is a less prominent and more dur color. The sea-green slate makes a good roof, as the quality is gene good, but the color will fade in time to a greyish shade. The purp not be relied on for color. The only red slate in the world which has been found practicable to quarry is found in Washington county, New York—although veins have been found in other states. It commands a good price on account of its scarcity, as the veins are thin, few in number, and soon exhausted. There are several shades of red, varying from a dark red to a light pink. The dark and medium color is the most reliable for both color and strength. The pink is apt to be brittle and to fade.

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Analyses show that the bulk of slate deposits are composed of silica and alumina, and were at one time ordinary clay. Slate does not possess the numberless varieties of color, nor the susceptibility of polish which marble assumes, and therefore on the strength of appearance alone, irrespective of adaptability, marble is very often used, especially for plumbers' work, where the use of slate would prove more sensible and lasting, because of its strength, imperviousness to water and fluids generally, and consequent cleanliness. The most important of the properties of slate, and that which gives it its value as a roofing material, is its remarkable cleavage structure, which may be defined as easily splitting, when first quarried, in planes parallel to each other. In no product of nature, except mica, is it developed to such a degree, and taken advantage of, as in the manufacture of roofing slates.

Slate is quarried by drilling holes and blasting, taking all possible advantage of slips, joints and floors, or, I might say, natural seams and peculiarity of formation, to displace it without unnecessary breakage, and as the planes of cleavage lie at an angle of from 45° to 60° it cannot be quarried like stone, on a horizontal line, but necessitates considerable judgment and ingenuity to economically loosen the blocks from the bed.

The blocks are then hoisted to the surface by the derricks, put on a truck and run to the slate makers' shanty. The blocks as they come out are very irregular, so one of the splitters' assistants breaks them into sizes suitable for splitting into slates; in length and breadth sufficient for handling, and about two inches in thickness. These blocks are placed in piles on the left hand of the splitter, who is seated on a bench raised a little from the floor. The splitter then takes a block between his knees, and with a wooden mallet, and a broad thin chisel, splits it through the middle, and continues dividing the blocks into equal halves, until they are reduced to the thinness of roofing slate. These thin pieces of slate of irregular sizes are then taken by an assistant and economically cut in a dressing machine to the various sizes in use. The dressing machine is an arrangement of knives which cut the slate somewhat similar to a pair of scissors. In the manufacture, it is put through the various processes without unnecessary delay, because it is more readily worked before the quarry water dries out. In fact, it almost loses the property of splitting when free from sap, and this is taken advantage of by using it for building work, such as sills, posts and slabs. Where a flight of iron stairs is desired, no better material for the treads can be found than a good quality of slate, because it will give a firm hold for the foot, and not wear out. A flight of stairs with a slate tread in an exposed and wet situation, if the tread has enough incline to allow the water to run off, will not become slippery, because the slate does not absorb the water. The trimmer or dresser, as the man is called who cuts the slate to size, sorts the slate as he makes them into first and second qualities, and also arranges each size together, ready to be carried and placed on the pile in the yard. Three grades of slate are made, to wit: No. 1, No. 2, and ribbon. No. 1 consists only of what is smooth in texture, uniform in color, straight in grain and free from knots. What lacks these qualities, and are not ribbon, is called No. 2.

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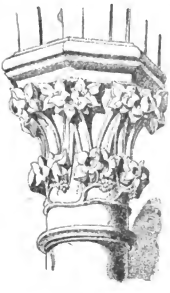
For making tiles, slabs, etc., the blocks of slate are first split to about the proper thickness. They are then sawed by band saws, the same as are used for sawing stone, to required sizes and put on a planing machine which is similar to those used in planing iron and stone, except that the cutter is wider. This machine shaves the slate to proper thickness, giving the surface a smooth, level face. The plates of slate are then put on a rubbing table and rubbed to the required finish.

The rubbing table is a round, flat piece of cast iron, from six to ten feet in diameter, revolving horizontally. The block to be rubbed is placed on the top of this revolving plate, and held in position. Sand is put on this plate, and water run on to it, and the blocks ground to a smooth surface.

In this paper I have collected all available information on the history of slate, localities where found and quarried, its various colors, uses, and methods of quarrying and manufacture, and trust the information will lead to the use good of material, the slight excess in cost of which will amply repay the consumer.

NEW MONUMENTS AT GETTYSBURG.



CAP—FRENCH GOTHIC.

THE Battle-field Memorial Association has contracted for what will give visitors to this field an additional advantage in understanding what transpired here during those three eventful opening days of July, 1863, namely, iron markers to show the names of the various avenues and the right and left of the lines occupied by each corps in the Union army, and each division of the corps. For this purpose fifty 12-pound navy howitzers, now in possession of the association, will be planted, and in each muzzle will be fixed an iron tablet showing, in large raised letters, the points of interest. To correctly establish all these Col. J. M. Vanderslice, of the committee on locations; Sergeant N. G. Wilson, superintendent of grounds, and Secretary John M. Krauth, of the association, spent several days recently, assisted by Col. J. B. Batchelder the historian of the battle.

At a recent meeting of the Memorial Association the southern part of what was known as Hancock avenue, which was occupied by Sixth Corps troops, from Weikert's lane to the base of Little Round Top, was named after the commander of that corps, General Sedgwick. From the southern end of this over Little Round Top to the Devil's Den, is named Sykes avenue, after the commander of the Fifth Corps. As all the other corps commanders were remembered in the naming of avenues, it was considered but justice to the corps to which the Pennsylvania Reserves belonged that a portion of the ground over which they fought should be named for the efficient corps commander who directed their movements.

During the last few weeks work has been actively pushed in the erection of New Jersey monuments. That of the Sixth Infantry is in place near Devil's Den, as is also that of the Eighth on the western edge of the wheat-fields. Parts of the Seventh and Clark's Battery have been set on the Trostle farm (a strip of land having been purchased by the Memorial Association), a short distance north of the peach orchard. The marker of the Twelfth Regiment will be placed at the site of Bliss building, their most advanced position.

Among the hundreds of monuments to be erected this season the more striking will be the Vermont State monument, fifty-one feet high, modeled after the Nelson monument in Trafalgar square, London; the Michigan Cavalry Brigade monument, about fifty feet high, surmounted by the statue of a cavalryman, the cap to show four horse-heads cut in bold relief, and the Eighty-third New York Infantry, a shaft fifty-one feet high surmounted with an immense bronze eagle, modeled from a bird shot on the battle-field of Gettysburg last summer, and purchased by the Smith Granite Company for this purpose.

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Notwithstanding the fact that California has granite of most excellent quality, until very recently it imported most of its granite from New England.

THE CYCLONE PULVERIZER.

MM. GEO. T. SMITH has shown himself to be a success in discriminating as to valuable mechanical devices and in putting them on a successful business footing. Mr. Edison has said that it takes more ability to make money out of an invention than it does to invent it. Certainly it is true that many clever inventions never would be of benefit if it were not for business and executive sense behind them. Inventive ability and business ability are rarely combined though this combination does exist in some prominent instances. Notably in the case of Geo. H. Pullman, Edison and others that could be mentioned. Mr. Smith combines the inventive and business qualities of a successful man. His record in the invention and manufacture of flour-mill machinery supports this statement. He possesses another rare quality in an inventor, he knows a good thing when he sees it, even if it is not his own. Mr. Smith's latest discovery is the Cyclone Pulverizer which grinds plaster, phosphates, spar rock, rosin, iron ore, or anything fed to it.

Said Mr. Smith, "I saw them turn into the pulverizer a keg of nails, and in a few minutes they came out the finest dust; nothing else, and the wonder is there is no noise, no grinding nor crushing of the substances as one would suppose must be necessary."

The New York *Sun* in speaking of the machine, says: "It is done by a terrific friction power that is generated in the machine producing two counter currents of air. The material to be pulverized does not touch a wheel, but is ground to impalpable powder by the friction of the particles against each other."

"The pulverizer is the invention of the Raymond Bros., who lived out West. They conceived the idea that if the cyclonic action of air could be utilized, tremendous force would be generated at little or no cost. It is nothing more than two concave discs, eighteen or twenty inches in diameter, with protruding cast iron wings. These discs are set facing each other, two inches apart at the bottom, and perhaps twelve wide at the top. These make 2,000 revolutions a minute in *opposite directions.*"

"What about the spraying of powdered coal into a furnace," was asked of Mr. Smith.

"A Californian by the name of J. G. McCauley, invented a combustion chamber for spraying powdered coal into rolling mill furnaces, etc. The coal thus sprayed has first been reduced to a powder in the pulverizer, and when thrown into the combustion chamber attached to a furnace it burns like gas. There is no waste, no ashes, nor smoke."

The pulverizer will be manufactured at Jackson, Mich., by the Geo. T. Smith Middlings Purifier Co.

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SEASONING OF QUARRIED STONE.

Two thousand years ago, Vitruvious recommended that stone should be quarried in summer, when driest, and be allowed to season two years before being used, so that the natural sap might evaporate. Sir Christopher Wren in the erection of St. Paul's Cathedral in London, England, required that the stone, after quarrying, should be exposed at the sea-shore for three years before being put into the building. This may have something to do with the preservation of the stone of this building. It is worth while that experiments as to the result of seasoning be made. If stone wastes by exposure there must be cracks left in which the rain can get. The freezing of this water causes the stone to break or peal, the cementing material to be ground to a state of powder. In a building of any size if seasoning would do anything to preserve the stone the expense incurred would be a trifle compared with the durability of the building.

AN IMMENSE JAPANESE STONE.

We rode to the citadel, one of the strongest and most elaborately built fortifications that I ever saw, and it must be one of the finest in the world. The solid stone embankments were fifty or sixty feet high and miles in extent, surrounding the interior fort. The moats were approximately a hundred feet wide and very deep, and the gates and approaches were massive in the extreme. On the hill as we went up to the highest point, I saw an immense stone which formed part of the wall. I was so struck with its immense size that I measured its length with my pocket rule. It was thirty-six and a half feet long. I could not measure its hight, but the officer of the guard told me through my interpreter that it was twenty-seven feet high and twenty feet thick. I have since been told by a master quarryman that if the measurement were correct (and I know I was correct in the measurement of the length) this mass of granite was twice as heavy as the Egyptian obelisk in Central Park, and yet the Japanese engineers had moved it from a great distance and had carried it up a high hill and set it in the walls of a fortification built of stones, all of which were so large that this, while it was striking for size, did not seem phenomenal. The Japanese are doll-like in their teapots and houses, but giants in their tree culture and fortifications—*Osaka Letter.*

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THE COLORADO STONE INDUSTRY.

The stone industries of Colorado are now giving employment, directly and indirectly, to about three thousand men. The upted strata of sandstone and quartzite along the eastern foot hills furnish paving, flagging, curbing, rubble and dimension stone of superior quality, and the mining is so cheap that the product can be shipped as far east as Indiana. This stone varies in color from gray to a dark red with all intervening shades. The stone is fine-grained, firm, highly silicious and wears rough instead of smooth like granite, with a resisting power inferior to granite only.

Near Fort Collins about four hundred men are employed in the stone quarries and about ten thousand car-loads are shipped annually. Over ten thousand square yards of paving are produced annually. The Union Pacific Company controls these quarries and the annual value of the output is about four hundred thousand dollars.

On the line of the Denver & Rio Grande R. R. are 16 quarries now sending out over one thousand two hundred cars per month, the largest quarry being at Calumet, in Chaffee county. Other quarries in Fremont, Pueblo, El Peso and Douglas counties are now being worked, for sand-stone, and marble quarries will probably soon be added in Chaffee and Gunnison counties.

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SAFETY MARGIN.

It is not safe to place stones in a building where they will have to bear more than one-tenth to one-sixth of their experimental crushing weight. A stone which will bear a given weight when taken from the quarry, may after exposure to the weather, bear only a small proportion of this weight. Again, stone taken from one part of a quarry will often vary greatly from that taken from another as to the weight which it will bear. Stones from the different parts of the same layer will often vary as to their strength. The place where a stone will crack is not to be determined at all times. It may be in a line of weakness arbitrarily situated which cannot be detected, or may be definitely situated and dependent upon structure. To be upon the safe side, one-tenth of the crushing weight of a stone is all that it should be made to bear.

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The first stone house built in San Francisco was of stone brought from China.

[Contributed.]

REGARDING ROCK.

EDWARD CONNELLY.

GRANITE, sandstone and marble are the principal and almost the only kinds of stone used in the erection of buildings, monuments, statuary and all kinds of ornamental stonework. I will, therefore, explain briefly the properties of each kind mentioned above, as I understand them from experience, and also the opinions formed by eminent geologists on the formation of stone.

Granite is called a primary, or igneous rock, which means first or fiery stone, and is composed of flint, feldspar and mica, which particles were once in a liquid state, when this planet on which we live was less solidified and younger than at this period. It was only when the earth's crust, which is now about seven miles thick, had hardened or cooled to a certain depth that the formation of granite and other primary rocks began. The cooling process of the earth and other planets, as you are all aware, is caused by its passage at an enormous rate of speed through space, and this is continually going on until perhaps the 8,000 miles through is changed from its fiery substance nto solid matter, a process requiring a great period of time, and the surface of the earth will be undergoing a marked change as well as the interior. You are all aware that when a body like our earth, cools from its liquid state, it contracts or becomes smaller, and hence it is that our hills and mountains with their granite and other formation of stone are forced from the bowels of the earth, where the stone composing them was formed under an enormous pressure, and the cooling process mentioned above. Hence it is that we have our granite hills while we find the same material miles below the surface of the earth with no other stone found beneath it. No sooner does the mountain or hilltop become exposed on the surface, than the process of decay commences and the particles begin to separate. Every rain storm carries from the hillsides large quantities of gravel, pebbles and sand. Every grain which was once a part of some solid rock, formed perhaps miles beneath the surface of the earth, is now starting on its journey down a rivulet or brook to some river, and finally deposited in the bed of the sea or some valley or lake covered over, with millions of its kind. This very natural process of forming into sedimentary or secondary sandstone begins when the conditions, favorable to that process, are attainable, the moisture of water furnishing the necessary properties for the particles to adhere, and the enormous weight of the sand, the slow process of their becoming petrified, after thousands of years, is finally consummated. This formation of rock is our sandstone, and is composed entirely of particles of sand with a finer substance of a similar kind acting as a cement in keeping the larger particles together. The above explanation will perhaps give a comprehensive idea of the formation of rock, and we may see that all stone is either primary or secondary, and that the decayed particles of the first formed composed the second also, so that sandstones are more recent than granite, ironstone or trap-rock.

We will now inquire into the componentparts of what is known to all as marble, which is found in great abundance. We find it upon examination, to be composed of the remains of animals, particularly of fishes, their bones and shells. The latter, when deposited in large quanities has a tendency to become petrified. Hence it is that marble is called by geologists "organic rock." Chalk and coal are also included in this class, though they are really not stone, such as granite or sandstone, but yet are classed as rock. Coal, therefore, is petrified forests, or timber, and other vegetation, and the peat bogs of Ireland would, in process of time, when dried up and covered over with earth, become coal mines.

To give an illustration of what changes are going on continually on this planet of ours, I take a piece of marble, as a good illustration. The Berkshire hills are now the highest land we have in Massachusetts, about nine hundred feet above the level of the sea, and when deposits were laid to form its marble and limestone of to-day it was not only beneath the ocean, but was the lowest or deepest part of it.

These are a few of the many changes going on continually around us in the mineral world, and we have learned that two-thirds of the earth's surface is now covered with water, and as it was at one time all covered, our earth is now in its prime of life. The scarcity of water, therefore, will be the cause of this planet becoming barren and old, as the moon is now, without atmosphere, water, or vegetable life. So will this world of ours give up its fertility, and nothing which we see around will be left but the rocks, whose only mission will appear to be to reflect the sun's rays, and serve as a moon, or appear as a star, among the many millions of this universe.

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A STATUE FORTY FEET HIGH.

The statue that is to surmount the new City Hall, Philadelphia, is to be of bronze. Owing to the extreme hight of the tower on which it stands, the figure is, of necessity, of mammoth size. The distance from the ground to the top of the head will be 540 feet, from which the reader will readily gain an idea of the magnitude of the work. The modeling of this gigantic figure has already been accomplished. The plan pursued was that usual in work of this kind—namely, making first a sketch of the model, of which the natural size model was to be an exact counterpart. The full size figure is 40 feet high and will weigh over thirty tons when completed in bronze. It is said to be the largest model of the human figure that has ever been made in this country. The modeling was commenced by placing a hoop of iron just above the point representing the crown of the head. From this hoop many small strings at different places were hung wherever it was wished to give firm lines. Along these lines marks were made so as to guide the modelers as to hights, widths and other points of comparison. Then there was prepared a wooden framework or skeleton on which the legs were modeled in clay. The whole figure was built up in this way in clay, but of course in sections. After the clay model had been finished, from each part – legs, arms, body, head, etc.,—casts were taken which will serve as patterns in the final casting process. The subject of the figure, it is scarcely necessary to remind the reader, is that of William Penn. No other figure would be considered appropriate. He is represented as a young man in the full vigor of manhood and in physical proportions which would render possible the traditions of his outdoing the Indians themselves in some of their feats of activity. The design, we understand, is taken from the original painting presented to the Historical Society of Pennsylvania by his grandson, Granville Penn. The figure is in a speaking attitude, and the left hand is represented as holding the original grant of the city of Philadelphia.—*Carpentry and Building.*

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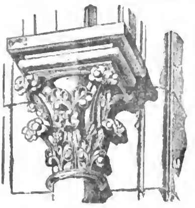
MAINE GRANITE.

The granite industry of Maine is quite an important one. During the past year a single company, the Bodwell, shipped from Vinalhaven 20,000 tons rough granite, 140,000 feet dimension cut stone and 500,000 paving blocks, aggregating 40,000 tons. An immense block, 300 feet in length, 40 feet in width and with an average thickness of nine feet, was recently started at a quarry at Vinaltown. The weight of such a mass is estimated at 12,000 tons.

MARBLE.



CAPITAL—13th CENTURY.

FROM a scientific standpoint, there is no difference between a marble and ordinary limestone or dolomite, the rocks having precisely the same composition and origin, but one possessing such color and structural peculiarities as render it desirable for ornamental or decorative work, while the other through the lack of these same qualities is relegated to the more ordinary purposes of general construction.

Generally speaking, we may say that a marble is a limestone (or dolomite) that has undergone just the right degree of metamorphism to develop in it points of beauty, and render it capable of receiving a smooth surface and high polish. In many of the most beautiful marbles the metamorphism has proceeded only so far as to harden the stone without destroying its fossil remains, while in others these have been entirely obliterated and the rock become crystalline throughout. Little as it seems to be appreciated, it is this crystallization alone that renders so many of the American marbles inferior to those of the French Pyrennees, Italy, and Northern Africa.

Nearly all our native stones of this class are too coarsely crystalline. This not only renders the production of a perfect surface difficult, but the cleavage facets reflect the light from below the surface in such a way as to cause it to be studded with innumerable minute silvery points, quite destroying its uniformity. However good the color may be, a stone of this nature must always rank lower than one that is so fine-grained and compact as to appear non-crystalline or amorphous.

Marble, though one of the most beautiful of rocks, has yet a most ignoble origin. At the bottom of some old Devonian or Silurian sea, there accumulated throughout untold ages vast beds of dead corals, shells, and other marine animals, embedded in fine calcareous mud. Throughout succeeding ages these were further buried by sand and mud, to be finally, by heat and pressure, hardened into stone. Not stranger is it that the dust of Alexander be found stopping a bung-hole, or that "imperious Cæsar, dead and turned to clay, might stop a hole to keep the wind away," than that the slimy ooze of a sea bottom, full of all manner of dead and uncanny things, becomes by nature's processes an object of beauty, admired alike by the most esthetic, fastidious and vulgar minded.

Of the $2,000,000 worth of marbles annually produced in the United States, more than one-half ($1,350,000 worth in round numbers) is from quarries in Vermont, and the remainder nearly altogether from Massachusetts, New York, Pennsylvania, Maryland, and Tennessee. The material is imported to the value of about six hundred thousand dollars annually, the supply coming largely from Italy, though smaller amounts are brought from France, Belgium, Portugal, Egypt, and Algeria.

The narrow belt of limestone from which is obtained the supply of Vermont marble extends from a point beyond the Canadian line throughout the entire length of the state, and thence through Western Massachusetts and Connecticut to Long Island Sound. Since early in the present century numerous quarries have been opened along this belt, but at the present writing the most extensive lie within the limits of the little village of West Rutland, cozily nestling among the green hills of central Vermont. The quarries themselves, to which the village owes its entire business prosperity, lie along the western base of a low range of hills, which, to the ordinary observer, give no sign of the vast wealth of material concealed beneath their gray and uninteresting exteriors.

In the quarry, the stone is found in layers from two to four feet in thickness, often mottled and streaked, and varying in color from pure white to deep blue gray and almost black. These layers, instead of lying horizontally one upon another, are at the surface steeply inclined and almost on edge, so that the same quarry at the same time may be producing marbles of half a dozen grades of color and quality.

In quarrying, the best beds are selected, and upon their upturned edges excavation is commenced; first by blasting, to remove the weathered and worthless material, and afterwards by channeling, drilling and wedging, no powder being used lest the fine, massive blocks become shattered, and rendered unfit for use. The quarry thus descends with almost perpendicular walls to a depth of sometimes more than two hundred feet, when the beds are found to curve, and pass under the hill.

In following them, the excavations assume the appearance of vast artificial caverns from whose smoke-blackened, gaping mouths one would little suppose could be drawn the huge blocks of snow-white material lying in gigantic piles in the immediate vicinity.—*Scientific American.*

THE INVENTOR OF DYNAMITE DEAD.

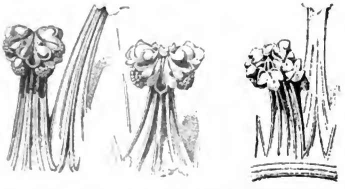
The world has lost one of its greatest experimental chemists by the death of Alfred Nobel, the inventor of dynamite, and the man who made the wide use of nitro-glycerine practicable. The new explosive that Sombrero discovered in Paris forty-one years ago, by treating glycerine with sulphuric and nitric acid, was never practically applied until after years of experimenting. Nobel succeeded in producing nitro-glycerine in a form that admitted of comparatively safe handling.

The knowledge of which Nobel's long investigations were the fruit was not obtained without the sacrifice of some human lives. Among the victims of the terrible explosive he perfected was one of his brothers. Nobel was a Swede, and in the quarries of that country he first demonstrated the efficacy of nitro-glycerine in its improved form. It was not long, however, before the use of nitro-glycerine for blasting purposes was superseded by Nobel's latter discovery of dynamite, which is now generally regarded as the safest as well as one of the most powerful of explosives.

Few families of the present day have made so remarkable a record as that of the Nobels. The father, who was in humble circumstances, won a comfortable fortune at one stroke by a torpedo which he sold to the Russian Government. The brothers Ludwig and Alfred created the present great petroleum industry of Baku. They substituted pipe lines for ox wagons for the delivery of oil at the refineries; doubled the yield of oil by improved methods of boring; invented the system of carrying petroleum in bulk in cistern steamers, which they found far more economical than the transport of oil in barrels, and developed methods for the cheap transportation of their product far and wide in Europe. While their brother Alfred became a great manufacturer of explosives, they have for years produced more refined petroleum than all the other European oil companies combined. A cable dispatch the other day reported that the project of piping petroleum from the Caspian to the Black Sea, which originated with the Nobel brothers, is about to be carried out.—*New York Sun.*

CROCKETS.

WE here present two choice bits of stone carving of the French mediæval period. They are elegant details, pleasant and instructive to look at, and of a character to be studied by those who wish to broaden their horizon by a wider knowledge in that which belongs to the art of stone cutting.



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IMPORTATION OF STONE INTO THE UNITED STATES.

The custom-house reports show the importation of stone into the United State, from nearly every country in the world. It it well known, of course, what stone comes from Scotland, England, Ireland, France, Germany, Belgium, the British North American provinces, and from Italy, and it is also known that onyx has been imported from Mexico, marble from Spain and Portugal, etc., and that marble has been imported from Sicily, granite from Norway and Sweden and Russia, and marble from Africa, but it is not so easy to account for the stone that is imported from British West Indies, Honduras, Central America, Cuba, Hayti, South America, Holland, and Turkey.

The only countries from which stone is constantly in the market in this country are Italy and Nova Scotia. The granite and sandstones from Scotland are imported for special orders. The same may be said of the granite imported from England and Ireland and the colored marbles from France and Germany – the brown sandstone of Germany, and the Caen stone of France.

The statistics of the Philadelphia custom-house show a large amount of dressed marble imported from England. Some stone is brought as ballast from Brazil, and marble and manufactures of marble from Danish West Indies, and the Netherlands, Brazil, Belgium, Cuba, British West Indies, Sweden and Norway, and some manufactures of slate from Germany. It is also stated that marble has been imported from Nova Scotia and from Canada. Some stone is entered on the custom-house books as "imported manufactured product," which consists of various carved figures picked up by tourists in different parts of the world. This fact may account for stone imported from any country; for instance, if a figure is carved in China and finds its way to Turkey, and is shipped from there to the United States, it will appear as the manufactured product of stone from Turkey. What the manufactures of stone are that have been shipped from South America and the West Indies could not be determined. Marble comes mostly in the manufactured state. The cost of labor is so much less in Italy than in this country, that the Italian marble, after paying the cost of transportation and a duty of 50 cents per foot and 20 per cent. ad valorem, can be sold in New York about as cheap as the Rutland marble. The cost of transportation from Carrara, however, does not differ much from the cost of transportation of a like amount from Rutland, Vermont.—*Government Report.*

EXPORTATION OF STONE.

Slate is now being quite largely exported to Australia and New Zealand; some to England and Germany, and some to South America and the West Indies. The most extensive exportations are perhaps to Australia. School slates are quite largely sent to Germany. Marble is exported to the British North American provinces, to the West Indies, and to Cuba; and the reports of the Philadelphia custom-house show that in 1878 marble was exported to England; in 1879 to Belgium, England, and Ireland; in 1880 to Belgium, England, and Japan. Soapstone has been exported to England. Quite a large amount of Carrara marble is brought to the port of Boston and from there distributed to the British North American provinces. The reason why this is done under the double duty instead of being shipped direct to the marker where it is consumed, is because large amounts of marble are shipped constantly to this country while these other markets receive but a small amount at a time; also because ships will bring cargoes for less money to Boston than to Halifax on account of being more certain of procuring a return cargo. These conditions account, in part at least, for the stone of foreign production that is shipped from the different ports of the United States.—*Government Report.*

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EGYPTIAN BRECCIA.

The very celebrated universal breccia of Egypt is composed of rounded pebbles of most diverse forms, color, and material. It occurs about 12 leagues to the east of Kene, in the Arabian chain of mountains, not far from the valley of Kossier, and on the railroad going from the Nile to the Red sea. The Egyptians have extracted from it some immense blocks—such as the antique sarcophagus of Alexander, which was 15 millimeters in circumference, and which was covered with hieroglyphics and delicate sculptures. The Romans carried away from Egypt a great number of such monuments at the time of the Pharaohs, and they themselves quarried this breccia. One can regard the universal breccia of Egypt as one of the hardest stones, one of the richest in color, and one of the most beautiful. Almost all the museums in the world contain statuary or ornamental constructions of some kind cut from this rock. The variety which appears to have been most admired by the ancients had a green color. The essential components of this variety were fragments of argillitic schist and porphyry, with here and there a pebble of granite, which, being much harder than the others, rendered the rock very difficult to work..

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GRANITE CUTTERS' TRIUMPH.

After a bitter struggle of more than a year's duration the lockout of the granite cutters in Massachusetts has been declared at an end, the manufacturers having agreed to pay the same bill of prices they were paying previous to the lockout.

The granite manufacturers wished to have the members of the Boston branch of the Granite Cutters' National Union accept a 10 per cent. reduction and an increase in the length of the day's work. These demands the members of the union refused to accede to, the result being the lockout.

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Of the $2,000,000 worth of marbles annually produced in the United States, more than one-half ($1,350,000 worth in round numbers) is from quarries in Vermont, and the remainder nearly altogether from Massachusetts, New York, Pennsylvania, Maryland, and Tennessee. The material is imported to the value of about six hundred thousand dollars annually, the supply coming largely from Italy, though smaller amounts are brought from France, Belgium, Portugal, Egypt, and Algeria.

BOOK AND PERIDODICAL REVIEW.

Gouverneur Morris. By Theodore Roosevelt. 364 pages; $1.25. Boston and New York: Houghton, Mifflin & Co. Indianapolis: The Bowen-Merrill Co.

There have been no additions to our literature of greater value than the "American Statesman," series of which this book on Gouverneur Morris is the last and one of the best. Through the books of the series we get a record of the early history of the country which cannot be obtained elsewhere. The variety of authors who write upon the different men who lived contemporaneously gives different lights upon a subject in a way to make possible a broad individual judgment. Those who have read the life of "Thomas H. Benton," by Mr. Roosevelt, will need no word of commendation for this volume. His style is so clear, and scholarly, his judgment so good, that his name on the title page of a book is sufficient guarantee of its value. Gouverneur Morris, while one of the hardest workers for our independence, was not one of the most brilliant or best known. Aside from a dreary biography written just after his death, and two or three magazine articles, there has been nothing written of him until this book by Mr. Roosevelt. To say that his work has been well done is faint praise.

Chips from a Teacher's Workshop. By L. H. Klemm, Ph.D. 408 pages; $1.00. Boston: Lee & Shepard; New York: Charles T. Dillingham. Indianapolis: The Bowen-Merrill Co.

Mr. Klemm has been a successful teacher for a great many years. He is the author of many articles of interest, which have been published in newspapers, periodicals and educational journals, and has filled various positions of trust in our schools. He is well fitted to instruct teachers and parents alike as to the best methods of teaching children, and this is what he undertakes to do in the book before us. Much of the work is compiled from papers which have been printed before but they prove of no less interest on this account. His views of teaching are sensible in the extreme. He says: "One of the most important principles of instruction is: whatever you teach, teach it with a view to its future use and practicability. Heed life's demands." This is his key-note and the methods evolved are in the main good. The book is full of interest to both teacher and parent.

Britons and Muscovites; or Traits of Two Empires. By Curtis Guild. 230 pages; $2.00. Boston: Lee & Shepard. Indianapolis: The Bowen-Merrill Co.

In "Over the Ocean" and "Abroad Again," Mr. Guild has made for himself a place with the reading public which "Britons and Muscovites" more than fills. He has a shrewd observation, a quiet humor and a practical view of what he sees which, coupled with his easy, unassuming style makes his books pleasant reading. He travels for amusement and instruction, and keeps his eyes well opened for what is to be seen, forming his opinions with true American promptness and pleasant dogmatism. In the prasent volume Mr. Guild sketches corners in England which are little known and tells many interesting things about the Russian Empire. His book is extremely entertaining and is at the same time so practical that it would serve as a traveling companion as well as something to entertain the casual reader.

First Steps with American and British Authors. By Albert F. Blaisdell, A. M. 345 pages; 75 cents. Boston: Lee & Shepard. Indianapolis: The Bowen-Merrill Co.

This is, as its name indicates, a book for use in schools. Mr. Blaisdell considers the older methods of teaching literature faulty. They give the scholar a view of what certain writers think of an author, and his works, without teaching much of the value of the works themselves. By his methods, as set forth in this book, he hopes to give a clearer view of the works of some of the most prominent English and American authors. His plan is simple—he desires the pupil to study systematically the works of the authors themselves, to gain their own opinions of the work presented to them instead of reading some one writer's opinions on those works. The selections from the authors considered are very happy, and the scheme for study simple.

A Kiss for a Blow. A Collection of Stories for Children, Inculcating the Principles of Peace. By Henry C. Wright. 204 pages; 55 cents. Boston: Lee & Shepard. Indianapolis. The Bowen-Merrill Co.

Mr. Wright was a prominent member of the American Peace Society, and an enthusiast in the anti-slavery struggle in America, as well as in other forward movements of his time. The little book which is here presented is a collection of stories for young children, in which he strives to show that they can live peacefully with their fellows. He says: "All who hate and injure us are our enemies. How should we treat our enemies? It is the object of this book to answer this question." The answer comes in short, plain stories, which are graded to the understanding of the youngest readers.

Irish Wonders. The Ghosts, Giants, Pookas, Demons, Lepre Chawns, Fairies and Witches, Widows, Old Maids, and Other Marvels of the Emerald Isle. Popular tales as told by the people. By D. R. McAnally, Jr. Illustrated by H. R. Heaton. 218 pages; $2.00. Boston and New York: Houghton, Mifflin & Co. Indianapolis: The Bowen-Merrill Co.

The title of this book clearly shows its contents, but it gives no hint of the beautiful illustrations of which there is such a wealth, no hint of the neat binding, beautiful type and paper. Every one knows the wealth of story there is in the Irish people. Their wonderful imaginative powers are displayed in their legends and fanciful tales and their peculiar wit here shows itself to the greatest advantage. One who likes fantastic tales and Irish wit will find here many a good laugh and much entertainment.

The Seven Little Sisters Who Live on the Round Ball that Floats in the Air. By Jane Andrews. 142 pages; 55 cents. Boston: Lee & Shepard. Indianapolis: The Bowen-Merrill Co.

This is one of the most charming books for children which has appeared since Miss Andrews "Ten Boys" was given to the world. The children read Miss Andrews' books with intense interest. The literary style is pure, the interest sustained, and at the same time she never forgot that her prime object was to impart useful information. The present book shows the life of seven children, belonging to seven nations of the globe. The book cannot be too highly commended for young children.

The Flower People. By Mrs. Horace Mann. 176 pages; 55 cents. Boston: Lee & Shepard. Indianapolis: The Bowen-Merrill Co.

Mrs. Mann has given the children a popular botany in the form of a story. She invests with life such common flowers as the children see from the snowdrop of early spring to the last flower to die in the autumn. In the form of conversations between these flowers and a child she teaches much of flower structure in a way which would otherwise be uninteresting to the young readers whom she will now reach. The book is of much value.

A SOLDIERS' MONUMENT FOR DELPHI.

Three months ago the commissioners of Carroll county, Indiana made an appropriation for the soldiers' monument, and appointed a commission of eleven ex-Union soldiers to select a suitable design. The commission has met frequently and studied designs from some of the best architects in the country, Indianapolis, Chicago, St. Louis, Cincinnati, Louisville and other cities being represented. The commission brought its work to a conclusion recently by selecting the design presented by Mr. A. A. McKain, of Indianapolis. The design is an original one, and is entirely different from any monument built in the country. In brief, the monument will represent a "Castle of Liberty," and will be built of Indiana limestone. The monument will be seventy-five feet high, surmounted by a colossal statue. The statuary and ornamentation will be in antique bronze. Large bronze plates, descriptive of scenes in the soldier's life, will ornament the faces of the base. The monument is to be erected in the public square, right in the heart of the city. The contract will be let at an early day.

The contract for the construction of this monument will be awarded about May 12. Indiana stone will probably be used for the whole structure, except the figures and bas-relief works which will be in bronze.

BUILDING STONE OF CORK.

A material called cork stone is extensively used for building purposes in Germany and Belgium. Patents were issued for its manufacture in 1880. It is claimed for it that it is a non-conductor of heat, cold and sound. The base of this material consists of pieces of waste cork, such as in many trades are thrown away unfit for use. These pieces, cut down to about the size of a pea, are mixed with a cement consisting of mortar and clay until each single particle is thoroughly coated with the cement, after which they are pressed into the proper shape and dried. From this manipulation results a porous body resembling in appearance the so-called Rheuish alluvial stone, but of much less specific weight, that of cork brick amounting at most to 0.30 or 0.35.

TESTS BY GENERAL Q. A. GILMORE.

THE general report of Gen. Q. A. Gilmore to the Board of State House Commissioners of Indiana at the time when they were preparing to make a selection of stone for the state capitol building is a valuable document and we here give it entire.

It mapped out the course of procedure for this Board which it would appear has led to excellent results as far as may be judged at this early date, in the competition of the building.

Board of State House Commissioners etc., Indianapolis, Indiana.

GENTLEMEN:—I have examined and tested for crushing strength, specific gravity and ratio of absorption, the twenty-three specimens of building stone received from Indianapolis by express, accompanied by a list signed by Robert P. Haynes, Secretary of the State House Commission. There were two 2-inch cubes of each specimen ground to accurate dimensions and smooth surfaces.

In the following table the "crushing strength per square inch" was obtained by taking one-fourth of the average crushing strength of the two cubes of each specimen.

The "ratio of absorption" shows the percentage of its own weight which a well-dried fragment of the stone, weighing half an ounce to an ounce, will absorb of pure water.

The "weight per cubic foot" is that of the thoroughly dried stone. Exposed to the weather this weight would be increased in the proportion of the capacity of the stone to absorb water.

All the cubes were crushed in a hydrostatic press, between thin sheets of white pine—this being the method usually pursued by me in testing building stones for compressive strength.

Marks on Cubes.	Names of Parties Supplying Them.	Crushing Strength per square inch.	Weight per Cubic Foot.	Ratio of Absorption.
A.	Dunn & Co., Bedford, Ind.	6,500 lbs	147.03 lbs	1-24
B.	Dunn & Co., Bloomington, Ind	13,750 lbs	127.24 lbs	1-43
C.	John Mueller, Buena Vista, O.	12,600 lbs	136.68 lbs	1-20
D	Clough & Co., Amherst, O.	8,250 lbs	133.75 lbs	1-18
E.	B. Schweitzer, Spencer, Ind.	12,250 lbs	146.59 lbs	1-35
F.	H Wrape & Co., Deputy, Ind	15,750 lbs	165.43 lbs	1-156
G.	Perry Brothers, Ellettsville, Ind	12,625 lbs	152.79 lbs	1-41
H.	Mathews & Son, Ellettsville, Ind	13,500 lbs	142.23 lbs	1-28
K.	S. M. Stockslager, Corydon, Ind	10,250 lbs	149.58 lbs	1-27
L	James E Lee, Putnamville, Ind.	11,750 lbs	166.36 lbs	1-170
M.	John Glover, Bedford, Ind.	10,125 lbs	152.39 lbs	1-32
N.	Chicago and Bedford Stone Co., Bedford, Ind.	11,750 lbs	147.66 lbs	1-28
O.	Hege & Jackson, Spencer. Ind	8,750 lbs	145.16 lbs	1-23
P.	Dark Hollow Stone Co., Bedford, Ind.	6,625 lbs	142.92 lbs	1-19
Q	E. Zink & Son, Salem, Ind.	8,625 lbs	144.28 lbs	1-22
R	William Gibson, Salem Ind	9,250 lbs	151.84 lbs	1-33
S.	Dunn & Co., Bloomington, Ind (Bluestone)	12,500 lbs	149.46 lbs	1-19
T.	Dunn & Co., Dark Hollow, Bedford, Ind	6,750 lbs	140.30 lbs	1-18
U.	Simpson & Archer, Spencer, Ind (No. 1.)	7,500 lbs	148.04 lbs	1-90
W.	Simpson & Archer, Spencer, Ind (No. 2.)	8,750 lbs	156.88 lbs	1-95
X.	Alex. Maxwell, East Canaan, Ct. (Marble)	12,875 lbs	177.89 lbs	1-756
Y.	W. W. Lowe, St. Paul, Ind.	16,000 lbs	168.29 lbs	1-366
Z.	Freensburg Limestone Quarry, Indiana	16,875 lbs	165.98 lbs	1-117

There are certain important items of information with respect to building stones besides those obtained by testing small cubes, which are necessary before a discriminating selection can be made from a number of specimens.

Weathering may affect a stone in the latitude of Indianapolis, either by splitting it along the planes of joints or of cleavage several months after it is quarried and dressed, or by a gradual and progressive disintegration of the exposed surface, due to changes of temperature.

Again, some rocks are composed in part of materials that are decomposed by exposure to the weather. This is the case with some feldspathic rock which contain potash, but would not be expected to produce decay in any of the specimens submitted to me.

Some rocks which present a very handsome appearance in situ—and even weeks and months after quarrying—become unsightly in time from discoloration produced by the presence of some metallic ingredient, principally and most frequently iron. Not infrequently a stone which in the open country will retain its natural color and brightness, assumes another and disagreeable shade in densely populated cities, or in the vicinity of furnaces, assay buildings and other manufacturing establishments.

The only safe way to determine whether the durability, strength, or appearance of a particular stone is likely to become impaired sooner or later from any of these agencies, is to examine it in its outcrop at and near the quarry, or in buildings or other structures where it has been exposed to the effects of the weather for several years. A stone placed in the exterior walls of a building, which has developed no objectionable features in fourteen or fifteen years, is not likely to yield at any latter day. This, however, is not an invariable rule, for in this city and throughout the New England States, some of the Connecticut Valley sandstones, placed near the ground in the basement of buildings, which show no tendency to disintegrate for the first twelve or fifteen years, give way to it quite rapidly after that period—particularly when not laid on the quarry beds.

If I now had to select a stone for the Indiana State House, I would, as the next step, cause all the quarries to be examined which furnished the specimens in the foregoing table having a ratio of absorption not exceeding 1-30. The examination should be made by an intelligent engineer or architect familiar with the practical use of building stones, and should extend to any structures, if such exists, in which the stone has been exposed to the weather for twelve or fifteen years. The selection should be made from among those showing the least effects of weathering in cracking, checking, disintegration or discoloration.

Having reduced the list in this manner, due weight should then be given to the question of color and cost, the preference being given, other things being essentially equal, to the stone possessing the greatest weight and the least capacity for absorbing water.

It is not at all likely that a mistake can be made after proceeding in the manner above indicated, in selecting the stone which possesses the most agreeable color, and can be obtained at a reasonable cost.

It is assumed that the samples sent me fairly represent the average products of the several quarries, and that blocks of the required sizes can be procured in the required quantities.

Very respectfully,
Your obedient servant,
Q. A. GILMORE,
Lt.-Col. Eng. and Bvt. Maj.-Gen. U. S. A.

MARBLE WORKS OF MARIETTA, GEORGIA.

Writing of the marble quarries of Marietta, Ga., Mr. Henry E. Colton says:

The valley is divided by a hill toward its upper end. South of this hill are the purest quarries, in which the marble on the west side is a mottled or striped white, on the east a pink and pink mottled or striped with dark lines. Northeast of the hill the marble becomes a crystalline white, almost alabaster. All this marble has large crystals, and is entirely without fossils.

The quarries are certainly a sight worth seeing. A few feet of surface earth is cleared away and then the stone is found lying comparatively flat, an opening once made the work is easy, the whole being in one mass without seams or drys. There would be no trouble in getting out a column a hundred or more feet long and eight to ten feet square if it could be handled. The largest blocks quarried so far are: One 10 feet long, 5 by 4 in size, the other 10 feet square. This last went to Cincinnati as a base for a monument. The great mechanical excellence of this stone is that being massive, without any seams or grain, it may be split or broken in any shape or direction. One stands on the bank over the quarry and looks down on a floor, from which the blocks have been taken, smooth enough for a dancing hall. Down in that floor, as one looks up on the high, smooth walls of white, a pink, striped with the many lines of smoke-like hue, I can imagine that through them, when that vast lake of calcic matter was forming, slowly crept the carbon smoke from some internal fire. The workers here truly dwell in marble halls.

The machinery of the quarries consists of four Wardell channelers; one diamond channeler; two Ingersoll drills and gadders; three steam derricks, and six gangs of saws five to eleven feet wide. There is also one Lidgerwood hoisting engine, which is guaranteed to hoist 50,000 pounds one hundred feet in one minute with a single one-inch steel line. The diamond channeler works by cutting a series of holes. It will cut two holes four feet deep in five minutes. The works of this company are situated two miles north of Marietta.

The operating machinery consists of nine gangs of saws, one of which is the largest in the world, being sixteen feet long and twelve feet wide, and in sawing inch stuff, will hold 144 saws. The others are eight and ten feet wide. At the Company's Marble Tool Manufacturing establishment, in Boston, a new machine is being constructed which it is estimated will do twice the work of the old style gangs. There are four large rubbing tables, as well as lathes for turning marble, a species of planer, a furniture slab machine, cutting machines of new patterns and machines for cutting moulding, etc. The most wonderful machine is a new invention for cutting the moulding around water basins, also for every variety of work now done by the slow process of the chisel. It is impossible here to describe it without illustration, but, it is a series of say six discs on the end of a vertical shaft which revolves at a very rapid speed. The discs incline to each other at the lower part, and by the manipulation of the workman are made to cut any character of line. I saw this machine in a few minutes hollow out the top of a washstand in which there were both straight and curved lines. One of the most interesting machines was the lathe in which are turned the vases and urns which adorn the monuments in our cemeteries. These are turned to a rough shape, then smoothed down with fine sandstone, which is brought from Nova Scotia, then polished in the usual way.

$0.00 TO $1.000.000.

Abraham Burbank, who died recently in Pittsfield, Mass., worked all his life as a brick and stone mason, and at his death owned real estate valued at $1,000,000.

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Building stone made of corn-cobs form the object of a new Italian patent. Ed. Clerici, of Milan, is the name of the patentee. The cobs are pressed by machinery into forms similar to brick and held together by wire. They are made water-tight by soaking with tar. These molds are very hard and strong; their weight is less than one-third of that of hollow brick, and they never get damp.

CONTEMPLATED IMPROVEMENTS

ILLINOIS.

Chicago—

Three-story 26x58; pressed brick and stone; flats. Estimated cost, $8,000. J. Wagoner, owner. Ostling Bros., architects.

Four-story 25x19; pressed brick and stone; flats and stores. Estimated cost, $13,000. Chas. Koester, owner. Ostling Bros., architects.

Four-story 73x80; pressed brick and stone; flats and stores. Estimated cost, $30,000. E. D. Ellis, architect.

Three-story 25x65; pressed brick and stone; flats. Estimated cost, $7,500. P. McAuley, owner. Wm. Strippleman & Co. architects.

Two-story 30x60; pressed brick and stone; residence. Estimated cost, $12,000. W. W. Clay, architect.

Three-story 28x65; pressed brick and stone; flats and stores. Estimated cost, $8,000. D. H. Hennessy, owner. Louis Martens, architect.

Two-story, 21x61, flats; pressed brick and stone. Estimated cost' $5,000. A. Sanderson, owner. Henry S. Sierks, architect.

Two-story, 60x74, residences; pressed brick and stone. Estimated cost, $20,000. A. McIntosh, owner. Edbrooke & Burnhams, architects.

Two-story, 25x65, flats; pressed brick and stone. Estimated cost, $7,000. F. A. Heinemann, owner. L. B. Dixon, architect.

Two-story, 22x50, flats; pressed brick and stone. Estimated cost, $6,000. S. K. Rowan, owner. H. T. Park, architect.

Three-story, 25x70, stores and flats; pressed brick and stone. Estimated cost, $5,000. Herman C. Andree, owner. Pentecost Bros., architects.

Three-story, 40x90, flats; pressed brick and stone. Estimated cost, $17,000. John Livingstone, owner. Henry T. Kley, architect.

Three-story, 27x55, store and residence; pressed brick and stone. Estimated cost, $7,000. Patrick Meehan, owner. A. L. Schellinger, architect.

Three-story, 45x75; residence. Pressed brick and stone; slate roof. Estimated cost, $20,000. Mrs. Julia E. Piper, owner. J. L. Dilsbee, architect.

Two-story, 26x70, residence; brick and stone. Estimated cost, $10,000. J. J. Hoch, owner. Burnham & Root, architects.

Three-story, 65x70, stores and flats; brick and stone. Estimated cost, $30,000. C. W. Elphicke, owner. F. B. Townsend, architect.

Four-story, 65x80, warehouse; pressed brick and stone. Estimated cost, $15,000. Chapman Bros., owners. F. B. Townsend, architect.

Four-story, 42x46, flats; pressed brick and stone. Estimated cost, $10,000. Henry Errieson, owner and architect.

Three-story, 24x70, flats; pressed brick and stone. Estimated cost, $7,000. Geo. Bodmer, owner and architect.

Eight-story building; rock-faced stone. Estimated cost, $200,000. W E. Bell, architect.

Two-story 45x50; pressed brick and stone; flats. Estimated cost, $10,000. C. Burcky, owner. Schaub & Berlin, architect.

Two-story 22x45; pressed brick and stone; flats. Estimated cost $5,000. Leamy & Green, owners. Pentecost Bro., architects.

Two-story 46x60; pressed brick and stone; stores and flats. Estimated cost $9,500. Mrs. Joseph Kirk, owner. Ackermann & Starbuck, architects.

One-story 146x146; brick and stone; warehouse. Estimated cost $6,500. Goulds & Austin, owners. Treat & Foltz, architects.

Three-story, 26x70, residence; rock-faced stone, curbing and pavements. Estimated cost, $10,000, Mrs. A. Wolf, owner. F. W. Wolf, architect.

Two-story 37x70, residence; stone front, slate roof. Estimated cost, $12,000. Geo. W Seaverns, owner. W. W. Clay, architect.

Two-story, 40x70, residence; stone basement. Estimated cost, $10,000. Joseph Couthoui, owner. Clinton J. Warren, architect.

Two-story, 25x70; residence; brick, stone front, slate roof. Estimated cost $10,000. E. Lipkon, owner. Frommann & Jebsen, architects.

Four-story 54x75; brick and stone; factory. P. C. Olaison, owner. E. Rohne, architect.

Two-story 24x50; pressed brick and stone; flats. Estimated cost, $6,000. I. T. Pelletier, owner. F. La Pointe, architect.

Two-story 25x70; brick and stone. Estimated cost $10,000. L. Wolf, owner. Frommann & Jebsen architect.

Two-story 25x70; residence; brick and stone. Estimated cost $10,000. E. Lipkin, owner. Frommann & Jebsen architect.

Springfield—

Two-story, 50x100, church; brick and stone, stone curbing and pavement. Estimated cost $25,000. Chas. F. May, architect, St. Louis.

Two-story, 40x100, business block. Brick and stone. Estimated cost $18,000. S. W. Currier, owner.

Three-story, 47x70, business block; pressed brick and Cleveland stone. Estimated cost, $20,000. George Pasfield, owner.

Auburn Park—

Street improvement. Estimated cost, $30,000. J. P. Maliette and R. E. Brownell, owners, Chicago.

Joliet—

Stone abutments and piers for bridge. Robert T. Kelley, city clerk.

Streator—

Two-story business building; brick and stone. Estimated cost, $50,000. H. F. Howland, owner. Harry Creager, architect.

INDIANA.

Seymour—

One-story; brick and stone; church Estimated cost $8,000. Joseph Balsley, architect.

Terre Haute—

Remodeling hotel. Estimated cost, $30,000. Marble work. Terre Haute Hotel Co., owners.

Muncie—

Stone and stonework for window-glass works. C. H. Over, owner.

Rochester—

Church; brick and cut stone. Estimated cost, $9,000. Rev. T. G. Smith, pastor.

St. Meinrad—

Three-story, stone, terra cotta; abby and college. Estimated cost, $300,000. Rt. Rev. Fintan Mundwiler.

OHIO.

Bowling Green—

Brick and cut stone; church. Estimated cost $9,000. J. W. York, architect.

Mansfield—

Penitentiary; stone. Levi T. Scofield, architect, Cleveland.

Toledo—

Street improvement; granite. Bids received till May 14, by city engineer.

Logan—

Enlarging culvert under canal. Board of Public, Works, Columbus.

Zanesville—

Four-story, 66x102, business block; brick and stone. Estimated cost, $20,000. Harper & Cosgrove, owners.

Cincinnati—

Police court; stone. Estimated cost, $300,000. Board of Public Works.

Findlay—

Three-story, 100x200, theater and office building; all stone. Estimated cost, $80,000. Vincent Wyss, architect.

Ironton—

Memorial hall, brick or stone, to cost $20,000. Dick Lambert Post, G. A. R.

KANSAS.

Hutchinson—

Four-stories 150x75; pressed brick and stone; business building. Estimated cost, $50,000. H. W. Wisler, owner.

Lawrence—

Three-story and attic, stone school building. Estimated cost, $35,000. Charles Robinson, superintendent.

Leavenworth—

Bridges (3). Contract to be let June 1. County Commissioners.

Four-story, 50x10; factory, brick and cut stone. H. J. Helmers, owner.

Topeka—

Business building, brick and cut stone. Estimated cost, $15,000. T. D. Thatcher, owner.

FLORIDA

Ocala—

Two-story, 54x70, bank building; pressed brick and stone; stone vault, curbing and sidewalks. Merchants' National Bank, owner.

MISSOURI.

Kansas City—

Street improvements, paving, etc. John Donnelly, city engineer.

Marshall—

Bridges (8). Clerk County Court.

Cape Girardeau—

Two-story, 40x60, court house; brick and cut stone. J. B. Legg, St. Louis, architect.

MINNESOTA.

Minneapolis—

Church; stone. Estimated cost $40,000. W. D. Dunnell, architect.

Stillwater—

Three-story, 75x100, business block; brick and stone. Estimated cost, $25,000. Isaac Staples, owner.

St Paul—

Four-story, 97x108, business block; Bedford stone. Thomas & Kretz, architects.

Four-story, 60x130, business block; brownstone. G. S. Moore, owner.

TENNESSEE.

Nashville—

Three-story stone residence, slate roof. Estimated cost, $10,000. A. V S. Lindsley, owner. T. L. Dismukes, architect.

Knoxville—

Two-story residence; cut stone. Estimated cost, $9,000. Stephenson, Getez & Co., architects.

Chattanooga—

Street improvement, paving; board of public works.

MICHIGAN.

Detroit—

Two-story, 40x50; business building and flats; brick and stone. Estimated cost, $4,000. Herman Merker, owner. Hugo Bloquelle, architect.

Four-story, 60x100, business building; pressed brick and stone. Estimated cost, $24.000; R. H. Hall, owner. Spier & Rohns, architects.

Jefferson—

Cemetery vault. The Cemetery Association.

Kalamazoo—

Bank vaults. Estimated cost, $10,000. Kalamazoo Safety Vault Co.

NEW YORK.

New York City—

Church; stone. Estimated cost, $120,000. B. E. Lane, architect.

Amsterdam—

Four-story, brick and stone hotel. Ernst Kurlbaum, owner.

Geneseo—

Church; cut stone and brick. Estimated cost, $15,000.

TEXAS.

Dallas—

Six-story bank building; pressed brick, stone, marble and granite. Estimated cost, $50,000. North Texas National Bank, owner.

Fort Worth—

Four-story, board of tradé building; stone, slate roof. A. J. Armstrong, Birmingham, Ala., Architect.

WISCONSIN.

Madison—

Three residences; stone and marble. Estimated cost, $10,000. John Lamont, owner. O. J. Williams, architect.

Ashland—

Three-story residence; cut stone. Estimated cost, $35,000. E. A. Shores, owner.

LOUISIANA.

Baton Rouge—

Three-story, I. O. O. F. hall. Pressed brick and stone; slate roof. Estimated cost, $10,000. A. J. Smith, secretary.

Abbeville—

Brick and stone court house. W. W. Edwards, architect.

KENTUCKY.

Millersburg—

Turnpike. The Brushy Fork Turnpike Co.

Louisville—

Street improvement; paving. Charles D. Jacob, mayor.

NEBRASKA.

York—

Three-story, 21x60, bank building; stone; stone curbing, sidewalks and vault. Estimated cost, $8,000. Mead State Bank, owner.

ARKANSAS.

Lonoke—

Four-story, business block; brick and stone. Estimated cost, $8,000. C. W. England, owner.

IOWA.

Ottumwa—

Two-story factory; brick and stone. Estimated cost, $10,000. Martin Hardsocg, owner. W. W. Ball, architect.

MONTANA.

Helena—

Three-story bank building; brick, granite and stone. Estimated cost, $60,000. L. H. Hershfield & Bro., owners.

MASSACHUSETTS.

Lancaster.

Residence; cut stone. Estimated cost, $75,000. E. B. Thayer, Boston, owner.

DISTRICT COLUMBIA.

Washington—

Three 3-story buildings; $18,000 each. F. T. Brown, owner.

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CARVING.

THE ROSE.

Marble will not bear any approach to nature in the thinness of the leaf and the arrangement of a blown rose turned outwards. It is, therefore, best to represent this flower turned to one side, and to attempt to form but a small portion of the number of the petals. To open these naturally, and to give them expression, is a work of great skill, and requires much observation, study, and persevering industry. It should be carefully born in mind that the ordinary carving on a headstone is to be viewed below, or immediately on a level with the eye. The pitch of the leaves and the relief of the petals should be regulated accordingly. The upper edge of the leaves should be pitched well into the stone, the outlines being barely traced. The lower edge should be well relieved. If this direction is carefully followed, the work will be relieved from that appearance of flatness which it the bane of cheap carving. Much of the effect depends upon the tools used. The work should be roughed out with sharped-toothed chisels and heavy mallet, and for the finish, narrow tools should be used, varying from one-fourth to one-eighth of an inch in width. It is best to give them a round finish upon the edge—from a slight departure from a straight line to almost a full round. Before hardening they may be placed in a vice, and by making use of a chisel already sharpened and hardened they may be cut into narrow teeth, leaving the rough edges forced out by the cutting. A scratching effect may be thus produced in carving, which has an excellent effect. A drill will be required to relieve the central portion of the rose. A judicious use of this tool will be found of the greatest possible assistance.

THE LILY.

This is one of the most attractive and beautiful of flowers when well carved. The leaves about the bottom of the plant are long and graceful in their sweeps and curves, but close to the flower they become short and abrupt in outline. The same rule in regard to the pitch of leaves as suggested in our past article in relation to the rose, holds good in adjusting the lily. The prominence of relief is governed by the extent of the ground work, and the depth of the carving. A lily should be placed obliquely upon the face of the stone, if alone. Placed either perpendicularly or horizontally it has a stiff, awkward look, and however well carved, it does not look easy and graceful.

It is, comparatively, a much easier task to relieve a lily than a rose, as it can be drilled around and spread with much less danger of injury. The inside work demands the most careful attention. The stamens and pistil are among the chief attractions of the flower; the pistil is the seed receptacle protruding from the flower, and is surrounded by the stamens, which are the fertilizers. In drilling above the center of the lily, and in relieving it, care should be taken to leave those portions until the last which acts as braces, and strengthen other parts. It is best to leave sufficient marble on the inside of the lily to carve the stamens and pistils out of, and then complete and relieve the outside portions, finishing up with the inside of the flower.

We have frequently seen lilies carved with seven and eight petals. It seems to some carvers as if the number of petals in a flower meant nothing, and depended merely upon the fancy sculptor, or the manner in which the marble could be most easily worked. The protecting envelope of the lily consists of six petals; of these, three are placed externally, and three internally, springing between the outside leaves. The external leaves differ slightly in form. The stamens are six in number, and the pistil appears as one stem swollen at the top, and standing in the center of the flower.

Combined with other flowers, the lily is very attractive, and in wreaths in high relief it figures conspicuously. It has a very good effect when carved upon the top of a small headstone, alone and relieved, so that it touches only along the lower extremity.—*The Stonemason.*

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The narrow belt of limestone from which is obtained the supply of Vermont marble extends from a point beyond the Canadian line throughout the entire length of the state, and thence through Western Massachusetts and Connecticut south to Long Island Sound.

GENERAL GILMORE.

Maj. Gen. Quincy Adams Gilmore, who died recently in Brooklyn, has been living in comparative obscurity since the war; but he was one of the very few Federal commanders whose fame was, for a while at least, as great in Europe as America, for it was his happy fortune to disprove all the laws of gunnery which had been supposed to be firmly fixed by the Crimean war. Gen. Gilmore was born at Black River, Lorain county, O., in 1825; graduated from West Point in 1849; became a captain of engineers early in 1861; was made general while before Savannah, and major general while before Charleston.

General Gilmore has had to do with a great deal of engineering work during recent years, and was particularly well posted as to the constructive value of building stone. We publish a report by him to the Indiana State House Commissioners on the building stone of the Indiana State Capitol building. We were about closing negotiations with him for a series of articles for this journal when his death ended the matter.

ESTHETIC MARBLE.

The Virginia (Nev.) *Enterprise* says by comparison of the chemical analysis of the Inyo marble and the best Italian and Vermont marble, it is shown that the Inyo marble is more durable and better resists the effects of acids and the action of the atmosphere than the imported article. This marble is entirely free from flint which is which is found in the imported article. Its specific gravity, as given by Professor Hanks, is 2856 a cubic foot, therefore should weigh 178.5 pounds avoirdupois, or a trifle over eleven cubic feet to the ton. In variety almost every color known in marble is found, besides some new and beautiful combinations from the pure white statuary and the black, the deep blue or blue and black, to a delicate dove color and golden or yellow-veined marble, and a mottled light drab and brown. There is also on cream ground a delicate creamed marble with figures of trees and ferns, like moss agate—something never before found, and which for chaste tints and attractiveness has possibly never been surpassed.

TO COLOR MARBLE.

By means of a simple chemical process a beautiful coloring of yellow is now given to marble without any injurious effect upon the polish or hardness of the stone. Neutral chloride of iron is for this purpose dissolved in 90 per cent. of alcohol, and after gently heating the marble to be colored, the solution in question is applied by means of a brush, a sprinkler, or by pouring, the strength of the solution being, of course, proportioned to the depth of color desired, and care being requisite also in regard to the degree of temperature. On the marble becoming completely dry it is moistened with water or exposed to moist air, when the decomposition of the salt of iron takes place in the upper strata, and the process of coloration is complete, all that remains to be done being to polish the surface, if necessary, or it may simply be rubbed off with a wet cloth. For light tints, very diluted solutions are applied.

SOLDIERS' MONUMENTS.

The era of soldiers' monuments is upon us. In one of the Western states which we have in mind there are at least six counties contemplating something of this kind. Once made an issue, it is sure to go through. Opposition to a soldiers' monument is sure to be classed as unpatriotic, if not disloyal. No political party can make an issue against it. It is a proposition, once under consideration, must go through. Opposition is excessively unpopular. The idea is a good one, and will make business for builders of structures of this class.

RED SLATA.

A paragraph appearing in the *papers* stating that red slate in this country was only found in four towns, led to an interview on the subject with Lieut. R. A. Hall, the proprietor of a red slate quarry on Hatch Hill, in this town, though on the very border of Granville. He confirmed the statement, though limiting the number of towns in this country in which red slate is found to three, and taking one from Vermont, Pawlet. There seems to be a little vein of this color of slate extending through a portion of the Mettowee valley, beginning with the Hatch Hill quarry, cropping out again in West Pawlet, where it disappears. Hampton, in Middle Granville, and finally the Hatch Hill quarries are the best, and indeed the slate from them is the only slate of the color soft enough to work; that in Hampton, in Middle Granville and in Pawlet being too hard.—*Whitehall (N. Y.) Chronicle.*

GRANITES.

To Maine belongs the credit of producing the only red or pink granite that can at all successfully compete in our markets with the imported Scotch granites or those from the Bay of Funday, New Brunswick, though excellent varieties for general building, and which are used to a less extent, occur in several other states. The beautiful pink granite used in the construction of the new Trinity Church in Boston is from Dedham, Massachusetts, while the coarser stone used in the new City Hall at Albany was taken from quarries at Milford in the same state. The two beautiful columns of deep red granite in the Senate Chamber of the new Capitol building at Albany are from quarries on one of the Thousand Isles in the St. Lawrence, while the four large pillars of pink porphyritic granite in the Assembly Chamber were furnished by quarries at Leetes Island, Connecticut.—*Scientific American.*

THE PROPOSED GRANT MONUMENT COMPETITION.

The American Institute of Architects and the executive committee of the Western Association of Architects have addressed a communication to the chairman and secretary of the executive committee of the Grant Monument Association, wherein they protest against the terms and conditions of the latter association. They object to the fact that the cost of the monument is not clearly set forth, that the experts who are to advise the association are not named, and that the character of the drawings required is not clearly set forth, that the presentation of models is made optional. They would ask that the successful designer be allowed to execute the design at the regular architectural rates and that the unsuccessful designs be returned to the competitors. It would appear that all this is reasonable.

THE BIG BENNINGTON MONUMENT.

The days of the monuments, which has only size to commend it, we had hope were past. The new Bennington monument is against our hope. It is only a huge pile. Height 301 feet; base 7½ feet. If it were a smokes tack it would merely be a high one. As a design, it is no more creditable than that for a very common smoke stack. This idea of merely making a big thing is barbarous, in that it had its origin in barbarous times. We have brought a part of such methods down to this time. The barbarian constructed a big thing, applauded it because he had done a difficult thing. The idea of the beautiful did not occur to him. It was not in him. It is left to this day and generation to occasionally imitate his ignorance.

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The contract for the new bridge over White river, near North Indianapolis, has been awarded to Messrs. Hicks & Holmes, this city. It will cost $21,000, and the iron will be done by the Canton Bridge Company.

INDIANA MONUMENT FOUNDATION.

The Soldiers' Monument Commission on May 1, opened bids for the construction of the foundation of that structure. The various bidders or their representatives were in an adjoining room at the time, and were called in occasionally to explain various points concerning their respective propositions. There was one bidder from Chicago and one from St. Louis, while the others were from this state and city. The reason that different estimates were given by the same bidder is because the expense depends upon the stone that is used and the distance that it is to be transported. The bids were as follows:

Greenwood, Madison & Fitzgerald—Foundation complete with stone from Bedford, Spencer, Stinesville, Ellettsville or Flat Rock, $39,000

Twiname & Petrie—Excavation and foundation of stone from the St. Paul, Greensburg or New Point quarries, $52,000; the Bedford quarry, $53,000.

Joseph Downey—Stone from Bedford, $47,459; part Bedford and part Flat Rock, $41,331; all Flat Rock, $35,900; all Romona, $36,700; part Romona and part Flat Rock, $36,400.

Enos Hege—Oolitic stone, $33,085.

Ross & Fritz—Indiana blue limestone, $29,506; St. Paul and oolitic, $32,466; oolitic, $36,307.

James S. Patterson, Greencastle and St. Louis, Mo.—Stone from Bedford, $30,430; Flat Rock or St. Paul, $22,810; Putmanville, $23,986; Flat Rock or Putmanville stone, bridge, $31,600.

J. A. Weiss, Columbus - Excavation and foundation, with stone from Romona Oolitic Stone Company, $39,600.

M. F. Powers, Chicago, Ill.—Stone from Flat Rock, $34,319; Romona, $34,599; if part Flat Rock and part oolitic, $34.455.

L. L. Leach, Indianapolis—Flat Rock stone, $45,229; Rosmond stone, $35,558; part Flat rock and part Rosmond $35,390.

The Commissioners will not award the work for eight or ten day, or until they have carefully considered the various bids and bidders.

CHICAGO QUARRY OWNERS' ASSOCIATION.

The Quarry Owners' Association of Chicago, held their annual meeting on 17th inst. Special report of the proceedings will be found on another page. The following officers were elected for the ensuing year: President, John Rawle; vice president, Robert C. Harper; treasurer, E. T. Malone; secretary A. F. Shuman, executive committee, E. T. Singer, E. E. Worthington, J. S. F. Batchen, John Worthy, C. B. McGenniss.

In the evening the association held their first banquet at the Grand Pacific Hotel.

"THE AMERICAN GEOLOGIST."

In compliance with what seems to be a desire on the part of the geologists of America, a few have united in an effort to establish an American journal devoted to geology and its allied sciences. This journal, of which the first number has just been issued, is known as *The American Geologist*, and will be published monthly at Minneapolis, Minn. The editors are Prof. S. Calvin, Iowa City, Iowa; Prof. E. W. Claypole, Akron, O.; Prof. Edward O. Ulrich, Newport, Ky.; Dr. Persifor Fraser, Philadelphia. Pa.; Dr. L. E. Hicks, Lincoln, Neb.; Dr. A. Winchell, Ann Arbor, Mich., and Prof. N. H. Winchell, Minneapolis, Minn. Judging from the copy received the new magazine will be devoted to geology in its widest sense, and to the interests of American geologists. It will include in the scope of its discussions and contributions all the sciences that are kindred to the general science of geology. The need of such a journal has long been felt in schools and colleges. Journals devoted to kindred subjects are numerous, but strange to say, none devoted to geology has heretofore been issued, American geologists have been so cosmopolitan and so industriously devoted to the details of their professional duties or scientific investigations that they have not been aware of the utility of organization and united effort. All correspondence for the new magazine should be addressed to Minneapolis Minn.

A NEW STONE SAW.

A new saw for cutting stone consists of a loosely twisted cord of steel, made to run around pulleys like a band saw. It is run at a high rate of speed, and cuts even the hardest stone with wonderful rapidity. Soft limestone is cut at the rate of twenty-four inches, an hour, Carrara marble about nine inches, and the hard granite of Britany nearly an inch and a quarter, while even porphyry can be worked at the rate of eight-tenths of an inch an hour. In cutting stone from the quarry with this saw the waste is only about one-half of one per cent., while by the usual method it is often 35 or 40 per cent., and the work accomplished is fifteen times greater than was possible by the old methods.

SPALLS.

Col. George P. Bissell and a party of Americans were traveling in Japan when they came to a number of natives gathered around a large bronze image of Buddha, at Kamakura. The Japanese set up a great clatter at the sight of the Americans, who broke out as one man in "Here's a how d'ye do." The natives were awed by the song, thinking it was offered as an invocation to Buddha.

Dr. Prenssner and Mr. Carl Spannagel, the German capitalist, who are investigating the question of making Portland cement in this country are at present engaged in inspecting the stone quarries of Indiana. They will visit all the towns where limestone is to be found, during their stay.

The property of the Oolitic Quarry, Company Romona, Ind., was sold April 7, by the receiver, P. C. Trusler, for $20,000. The purchaser was Samuel O. Pickens, of Indianapolis. It is surmised that the purchase was made for the Pennsylvania Railroad Company.

There is an increasing tendency to build pitched-faced buildings. The recent movement in this direction was brought by the work of the late H. H. Richardson. It has been augmented by his disciples until now there is something more than a rage for this kind of work.

For cement to make joints for granite monuments use clean sand, twenty parts; litharge, two parts; quicklime, one part, and linseed oil sufficient to form a thin paste.

The *Granite Monthly*, published at Concord, N. H., is devoted to the literature, history, biography, genealogy and advancement of New Hampshire.

Crystalline limestones are not suited to making road-beds, as their structure causes them to shatter and fall into a powdery state beneath the wheels.

A Boston sculptor who has been making a bust of James Russell Lowell says he has found it a most interesting task; the face is so subtle.

Ohio produces one-third of the sandstone of the country; Pennsylvania comes next; New York and New Jersy follow.

Dakota sandstone is from 250 to 400 feet in thickness, and forms the foot-hills which entirely circle the Black Hills.

Oolitic stone is so called on account of its resemblance to the roe of fish (egg-stone), so says Professor Cox.

Less is known of the building stones of Maine than any other New England state.

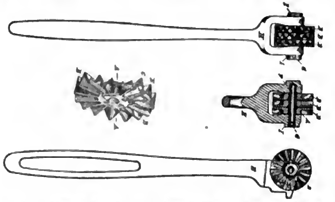
There are thirty states and territories which are known to contain stone quarries.

As a stone-producing state Pennsylvania ranks second.

REGENT PATENTS.

ISSUE OF FEBRUARY 21, 1888.

No. 378,313—Stone-Dressing Tool. Milton P. Higgins, Worcester, Mass. Filed March 11, 1886.



CLAIM—1. A grindstone or emery-wheel dressing tool comprising the holder H, having the axle F near its end, a rotating cutter consisting of a hub carrying blades of nearly uniform thickness, and having flat surfaces, said blades extending from said hub, and their cutting edges formed by their exterior ends standing oblique to the axis of the cutter and having their meeting edges united and supporting each other, thus forming angles on both sides of the cutter, substantially as above set forth.

2. The combination, with the holder H, provided with hubs I, having openings in their inner surfaces, of the axle F, for supporting the cutter, having a slot in one end thereof, and a pin, G, for holding said axle in the hub I, and preventing it from turning therein, substantially as shown and described.

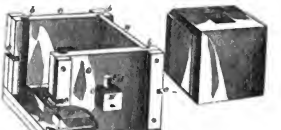
3. A rotary wheel cutter comprising a central perforated hub with a surrounding integral angular flange or corrugated wing, of substantially uniform thickness throughout, whereby the periphery of the wheel presents a thin zigzag edge continuously from the full-sized wheel until worn down to the hub, substantially as shown.

ISSUE OF FEBRUARY 28, 1888.

No. 378,632—Mallet. Chas. A. Svensson, Buffalo, N. Y., assignor of one half to William W. Oliver, same place. Filed June 8, 1886.

CLAIM—The combination, with the hammer-head A, having its end provided with an external screw thread, of a removable beating face having a laterally-projecting base and a collar surrounding the removable face, and having an internal screw-thread engaging with the threaded end of the head, whereby the removable face is secured to the head, and projecting inwardly at the outer end to overlap the projections of the face, substantially as set forth

No. 378,715—Manufacture of Artificial-Stone Blocks. James S. Peirce, Minneapolis, Minn. Filed June 8, 1886.



CLAIM—The mold for making artificial-stone blocks, composed of removable sides and base, strips A; and a removable core to extend through opposite sides of the mold and be removed without removal of the sides, substantially as described.

2. The combination of the base, the side pieces formed with openings opposite to each other and having ways or grooves formed in their inner faces the end pieces fitting into said ways, and the removable core passed through the openings in the side pieces and secured by pins passing through the ends, substantially as described.

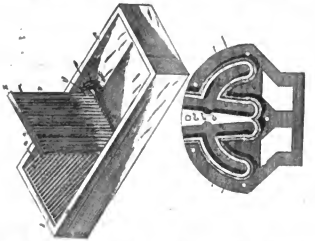
No. 378,765—Box for Washing Gravel etc. Thomas W. Carrico, San Antonio, Tex. Filed July 25, 1887.

CLAIM.—1 In a device of the character described, the main box having grates situated therein, the lower edges of which are extended outwardly, and the lugs formed upon the said grate, in combination with plates secured to the sides of the said box, and having grooves for the reception of said lugs and the extended portion of the grates, all arranged and combined to operate substantially as shown and described.

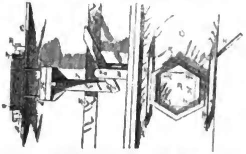
2 In a device of the character described, the main box provided at its inner ends with cleats and having grates situated in the said box, the lower extremities being extended outwardly and the sides having lugs or projections, in combination with plates secured to the sides of the box and formed with vertical and curved grooves for the reception of the extended portion of the grates and the said lugs, respectively, all combined and arranged to operate in the manner and for the purpose substantially as herein shown and described.

3. In combination with the main box, plates secured thereto and having vertical and curved grooves and a projection between the vertical grooves, substantially as herein shown and described.

4. In combination with the main box, plates secured thereto and having vertical and curved grooves, and a projection between the vertical grooves formed on its opposite sides with grooves, and the grates having lugs running in the said grooves, all arranged and combined in such a manner that access can be had to the bottom of the box without removing the grates, substantially as shown and described.



No. 378,716—Means for Molding Artificial-Stone Blocks or Tiles for Paving and other purposes. James S. Peirce, Savannah Ga. Filed June 6, 1887.

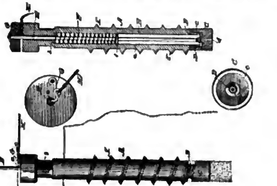


CLAIM.—1. The within-described apparatus for making artificial stone tiles, the same comprising a mold A, and a cover F, to drop around and be lifted from the same, and provided with an inwardly-projecting flange to fit over the top edge of the mold, substantially, as and for the purposes described.

2. The within described apparatus for making artificial-stone tiles, the same comprising a mold A, a cover F, to drop around and be lifted from the same, a false bottom to the mold adapted to be removed therefrom, and means for lifting said false bottom, substantially as and for the purposes described.

3. The within-described apparatus for making artificial-stone tiles, the same comprising a mold A, and straight-edges E on opposite sides of the mold, substantially as and for the purposes set forth.

No. 783,820—B ng-Plug. Alfred Wi er, Washington, D. C. Filed Aug 20, 1887



CLAIM.—1. The blasting-plug herein described, consisting of the body or main portion having a longitudinal bore, and provided externally with a spiral rib or thread and having a threaded extension, the hammer-rod operating through the bore of the body or main portion, the detent pivoted to the body or main portion and arranged to engage the hammer-rod, substantially as set forth.

2. A blasting-plug having its body or main portion provided externally with a spiral rib or thread, and having its lower end formed with a threaded extension to receive the removable cap-support, combined with the cap-support, the hammer-rod, and the detent, the threads on the body or main portion and on its extension being formed in similar directions, whereby the inturning of the plug will not operate to turn off the cap-support, substantially as described.

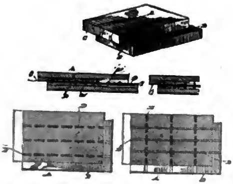
ISSUE OF MARCH 6, 1888.

No. 379,027. Block for Paving, etc. Frank M. Pickering, Cincinnati, Ohio Filed Jan 5, 1888.

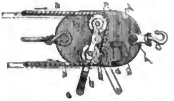
CLAIM.—1. A block of artificial stone for paving and other purposes, having lips or ledges on the edges thereof, and strengthening-bars extending through and forming a portion of said lips or ledges, as set forth.

2. A pavement or sidewalk composed of blocks of artificial stone or other material, said blocks being provided with supporting-lips, offsets, or ledges in their edges, said ledges being strengthened by metallic or other suitable bars.

3. In an artificial-stone block for paving and other purposes, a strengthening-bar embedded in said block having an enlarged central portion, said bar being cut away at its ends through such enlarged portion to form an enlarged bearing-surface on the lips or ledges of the block, as set forth.



No. 379,113. Block and Tackle. Charles J. Hibberd, Annapolis, Md. Filed Nov. 25, 1887.



CLAIM.—1. An improved block and tackle consisting of the pulley-blocks A and B', the cable B, the bifurcated lever D, pivoted within the block A and having the pulleys E E', the bar A', having the swivel mounted thereon, and a recessed block in the pulley-block A between said lever and bar and at one side of the vertical center of said pulley-block, said recessed block having two downwardly-extending arms adapted to pinch the cable at different points, whereby said cable may be securely held, as herein described.

No. 379,147. Friction-Primer for Blasting. Albert F. Andrews, Avon, Conn. Filed Dec. 27, 1887.

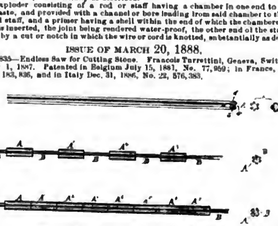
CLAIM.—1. An exploding device consisting of a staff having a chamber containing an igniting-paste in which a strip of wire is embedded, said wire being extended from the chamber and looped or knotted in a notch or channel formed around the staff, substantially as described.

2. An exploder consisting of a staff having a chamber at one end filled with friction-paste and a wire embedded within said paste and carried through a channel in the staff to a point near to the other extremity, where it is looped or knotted in a notch or channel formed in the staff, substantially as described.

3. An exploder consisting of a rod or staff having a chamber in one end to contain friction-paste, and provided with a channel or bore leading from said chamber to the other end of said staff, and a primer having a shell within the end of which the chambered end of the shaft is inserted, the joint being rendered water-proof, the other end of the staff being weakened by a cut or notch in which the wire or cord is knotted, substantially as described.

ISSUE OF MARCH 20, 1888.

No 379,835—Endless Saw for Cutting Stone. Francois Turrettini, Geneva, Switzerland. Filed July 1, 1887. Patented in Belgium July 15, 1881, No. 77,959; in France, Oct. 29, 1887, No. 183,836, and in Italy Dec. 31, 1886, No. 22, 576,383.



CLAIM.—1. An endless band-saw for cutting stones, formed of steel or iron wire having a number of peripheral grooves running parallel to the axis of the wire, substantially as and for the purposes set forth.

2. An endless band saw for cutting stone, formed of tubular steel or iron wire having a number of peripheral grooves running parallel to the axis of the wire, and a wire core passing through the tubular sections and connecting them together, substantially as and for the purposes specified.

ISSUE OF MARCH 27, 1888.

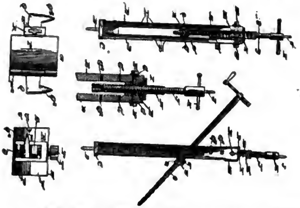
No 380,051. Hand Rock-Drill. James O. Patridge, Wellston, Ohio. Filed Nov. 10, 1887.

CLAIM.—1. In a hand-drill, the combination, with a post provided with two uprights having a series of apertures in their front edges, of a nut made in two parts hinged together and formed with integral right-angled projections and fitting into said apertures in the uprights, substantially as shown and described.

2. In a hand-drill, the combination, with a post provided with two uprights having a series of apertures in their front edges, of a nut made in two parts hinged together, right-angled projections formed on one of the hinged parts and fitting into said apertures in the uprights, a bail pivoted to one of said hinged parts and provided with a thumb-screw, and a lug, S, formed, on the other hinged part, whereby the said hinged parts may be securely locked together, substantially as shown and described.

3. The nut N, formed of two hinged parts, one of said hinged parts having sidewise-extended lugs Q and Q', each provided with a pointed projection, Q^2 extending in the direction of the axis of the nut, and means, substantially as described, for locking said hinged parts

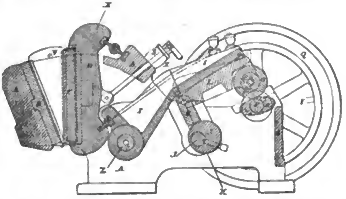
4. The nut N, formed of two hinged parts, P and P', the part P being provided with the sidewise-extending lugs Q and Q', each provided with a pointed projection, Q^2 extending in the direction of the axis of the nut, and the bail R, having the thumb screw T, pivoted to the lug Q, and the part P' being provided with a lug, S, against which the thumb screw T bears, whereby the said hinged parts may be securely locked, substantially as shown and described.



5. In a hand-drill, a post provided with two uprights and cross-pieces held on the top of said uprights, in combination with an internally-threaded toothed bar adapted to slide on said cross-piece, a screw-rod pointed at its upper end and screwing in the said bar, and a sliding supporting-plate engaging the teeth of said bar and held on top of said cross-piece, substantially as shown and described

6. In a hand-drill, the combination, with a post provided with two uprights having apertures near their upper ends, a cross-piece held between the uprights near their upper ends, and bolts passing through said apertures in the uprights and into apertures formed in said cross-piece, of an internally-threaded toothed bar held to slide in said cross-piece, a screw-rod pointed at its upper end and screwing in said toothed bar, and a sliding supporting-plate engaging the teeth of said bar and held on top of said cross-piece, substantially as shown and described

No. 3 0,121. Rock Breakers or Ore-Crushers. James H. Lancaster, New York, N. Y. Filed Dec 3, 1886.



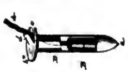
CLAIM.—1. In a rock-breaker or ore-crusher, the combination of the frame of the machine the vibrating jaw, the toggle H, fastened to the main frame supporting said jaw, the thrust-piece X, the rocking lever I, operating said jaw, the cam-shaft P, the dog L, having a convex upper surface, and the cam R substantially as described.

2. In a rock-breaker or ore-crusher, the combination of the frame of the machine, the connecting-rods passing through a portion of the main frame, having rubber blocks or springs mounted on one end thereof, the vibrating jaw, the toggle H, fastened to the main frame supporting said jaw, the thrust-piece X, the rocking lever I, operating said jaw, the cam-shaft P, the dog L, having a convex upper surface, and the cam R, substantially as described.

3. In a rock breaker or ore-crusher, the combination, with the frame of the machine, the dog L, lever I, thrust-piece X, and vibrating jaw D, of means, for limiting the throw of said jaw, consisting of the rod journaled in the side of the frame and provided with the hand-wheel E and worm e, the worm-wheel G, shaft J', carrying said wheel, the eccentric J on said shaft, and the block K, substantially as shown and described.

ISSUE OF APRIL 3, 1888.

No. 380,477—Cap-Protector for Blasting-Cartridges. Thos. DeCoar and William Keast, Russell Gulch, Colo. Filed Dec. 15, 1887.



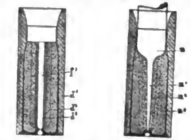
CLAIM.—1. A shield for fulminate caps formed of a tube having an opening at one end for the insertion of the cap, and provided with a lid to partly close the opening after the introduction of the cap, substantially as described.

2 The shield D, formed of a closed tube pointed at one end and provided with a head b, at the opposite end, said head having an opening, c, and a lid d, substantially as described.

ISSUE OF APRIL 10, 1888.

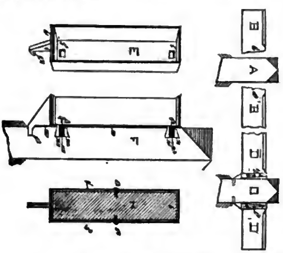
No 380,696—Method of Compressing Gunpowder or Analogous Materials. William Lorenz, Carlsruhe, Baden, Germany Filed June 16, 1887.

CLAIM.—The herein-described method of filling hollow bodies—such as cartridge-shells, etc.—with compressed gunpowder or other compressible materials, which method consists, first, in filling such hollow body to a certain degree with the compressible material, then introdu [illegible] a tapering needle into the center of such material for effecting a radical compression of the same and producing a longitudinal canal therein, then filling each canal with another charge of said material and repeating said process, and finally forcing a die



into the open end of said hollow body for effecting the axial compression of the several annular layers of radially-compressed material.

No. 380,710.—Metallic Socket-Connection for Stone Coping. William Williams, Huntingdon, Pa. Filed June 9, 1887.



CLAIM.—1. In a coping or curbing, the combination, with panels having unwrought ends a^2 a_3, of the intermediate posts, C, provided with metallic sockets a a' for the reception and support of the adjacent pieces of stone, and jointed together with soft metal, substantially as described.

2. The combination, with a stone coping, of the metallic socket E, having apertures $f f$, leaden bottom e', brace e, and dowel e^2, substantially combined for the purpose specified.

3. The combination with a stone coping, of the metallic socket E, apertures f f', leaden bottom e' braces, and dowel e^2, half-wedge tenons a' a^3, independent half-wedge tenons n a^3, lead backings m m', filling of soft metal a_5 a^6 between half-wedges, substantially for the purpose set forth.

4. The combination, with a stone coping of the socket E, having an interjacent stratum of lead filling, s s' s^2, and set-screws s^3 s_4, substantially for the purpose set forth, as described.

No. 380,880.—Artificial Stone. Oscar A. Tanner, Jersey City, N. J. Filed Sept 12, 1887.

CLAIM.—The composition of brimstone, plumbago, silica, paraffine, and coal-tar, in proportion substantially as herein described for the purpose set forth.

TRADE-MARKS.

15,230.—Cement. Howard Fleming, New York, N. Y. Application filed January 21, 1888. Used since February 1, 1887.

"The representation of a St. Andrew's cross."

15,231.—Magneto Blasting-Machines, Electric Batteries, Fuses, Blasting Caps and Wires. James Macbeth, New York, N. Y. Application filed February 8, 1888. Used since August 1, 1887.

"The word 'Victor.'"

DESIGNS.

18,196 to 18,198, inclusive.—Gravestone. William R. Stearns, Melrose, and G. Wilton Lewis, Malden, Mass., assignors to the Highland Slate Manufacturing Company, Portland, Me. Application filed February 4, 1888. Serial Nos. 263,061 to 263,063, inclusive. Term of patent 14 years.

18,199.—Gravestone. William R. Stearns, Melrose, and G. Wilton Lewis, Malden, Mass., assignors to The Highland Slate Manufacturing Company, Portland, Me. Application filed October 25, 1887. Serial No. 253,376. Term of patent 14 years.

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GOVERNMENT STONE CONTRACTS.

THE following from the regular specification of the government architect's office indicates their methods of doing business:

CONDITIONS OF BID.

Proposals are to be made on a blank form hereto attached, and must state the sum or rate required to fulfill a contract in accordance with the specification and drawings; also the time required to complete the contract.

With each bid must be sent a certified check for $......... drawn to the order of the Treasurer of the United States, as a guarantee that the bidder will perform the work if the contract be awarded him; and, if the Department so desire, will execute a formal contract within two weeks from the receipt thereof, for the said work, giving a satisfactory bond for the faithful performance of the same.

The checks of the unsuccessful bidders will be returned upon the award of the contract; that of the successful bidder, upon the approval of the formal contract by the Secretary of the Treasury; or upon the satisfactory completion of the work, in case such contract shall not have been required. Should the successful bidder refuse, or fail to execute such contract or bond, his check will be forfeited, and the contract become null, if the Secretary of the Treasury shall so direct.

Proposals will be considered only from parties giving satisfactory references.

The names of the officers of any corporation, or of the members of a firm, submitting a bid must be given in full in the proposal, in addition to the corporation, or the firm, signature.

Generally, payments will be made as the work progresses and in accordance with the terms of the contract, 10 per cent. of the value of the work done—20 per cent. on heating apparatus—being retained until the final acceptance of the work.

Parties obtaining copies of the drawings, etc., must return them within.............. days from the date of receipt.

Each proposal must be inclosed in an envelope, sealed, and indorsed "Proposal for...;" and addressed to the Supervising Architect, Treasury Department.

The Government reserves the right to reject any or all bids, and to waive defects, should it be deemed in its interest to do so.

Each bidder is requested to examine the site, and must assume responsibility for all errors or omissions on account of his failure to do so.

The dimensions given on the drawings are in accordance with the general plans, but as variations may occur, or may have occurred, in construction, the contractor is required to make his measurements at the building, construct his work accordingly, and will be held responsible for any errors in his figures and for the proper fitting of his work.

CONDITIONS OF CONTRACT.

Proposals must include the furnishing of labor and materials—with scaffolding, fixtures, machinery, tools, etc.—necessary for the complete and substantial execution of everything described, shown, or reasonably implied in the specification and drawings, without any extra charge whatever and to the satisfaction of the Supervising Architect, whose decisions on all questions pertaining thereto shall be final.

All materials must be the best of their several kinds, and all workmanship of the best quality.

The Supervising Architect reserves the right to make any alterations in the work without affecting the validity of the contract; the value of such alterations, at market rates, to be taken from or added to the amount to be paid under the contract, but no additional compensation will be allowed unless the price be first agreed upon and the work authorized, in writing, by the Supervising Architect.

The contractor must lay out his own work correctly, and be responsible for measurements. The contractor must give to the proper authorities all requisite notices, obtain official permits and licenses, and pay all proper fees for the same, and must be responsible for all damage or injury caused to persons and property through his operations.

The Supervising Architect, or the superintendent, may require the contractor to remove from the premises such of his materials or work as is not in accordance with the specification, and to substitute, without delay, satisfactory work and materials, the expense attending the same to be borne by the contractor.

All rubbish must be removed and the premises be left broom clean.

If the contractor fail to complete the work within the time specified in the contract, a forfeiture of.................dollars will be exacted for each day's delay.

SAMPLES.

Each bidder to submit with his bid samples of the stone, brick, cement, sand, marble, tiling, and finished wood he proposes to use, and such other samples as may be required for approval afterwards.

CONCRETE.

The trenches, of dimensions shown on drawings, to be filled with concrete. The concrete to be composed of five parts of sound stone, broken to about the size of 2-inch cube, two parts of clean sharp sand and one part of American hydraulic cement, to be well mixed and laid in layers about six inches thick and gently rammed down. Each layer to be wet before the next is added, and leveled with a skim coat of cement-mortar properly grouted in. Proper provision to be made for the passage of drain-pipes, etc., where necessary, or shown on drawings. Centers for inverted arches, where shown on drawings, to be formed of concrete to suit the line of the extrados of the brick arch.

The floors to be leveled up to within............inches of finished floor with cement concrete. The concrete to be filled in to the top of the strips after the wooden strips or porous terra-cotta floor-tiles are laid.

Concrete for tiled floors to be leveled up to within 2 inches of floor-line.

STONE FOOTINGS.

Stone footings to be furnished and set on top of concrete or where shown, in two courses, breaking joints, of dimensions shown on drawings.

STONEWORK.

All parts of exterior walls hatched in drawings in full lines to be faced with stone.

Basement, from at least 4 inches below grade to..............................water table, to be ....stone, superstructure to be..

The steps, platforms, door sills,..

Cap and bondstones for interior piers to be of..

Man-hole covers to be of..

The remaining stone required to be such as may be approved by the Supervising Architect.

The contractor to fill in blanks of the following table, accompanying the specimens furnished by him to the office of the Supervising Architect.

Specimens.	Weight by the cubic foot—pounds.	Crushing and tensile strength—pounds.
Granite..............................	....	....
Sandstone..............................	....	....
Limestone..............................	....	....

All stone to be close-grained, of an even color and texture, and to rest in the walls on the natural bed.

The body of the stone facing to be..

Rock-faced stone to be pitched off true from joint line, projection not to exceed 1½ inch.

All belt courses, water-tables, steps, platforms, tops of buttresses, sills, voussoirs, lintels, reveals, trimmings, etc., to be..cut work if of granite.

All molded work to be cut sharp and clean and all carved work to be executed artistically, and be spirited, both according to drawings or models.

The stone ashlar to bond into backing ....inches.........inches, alternately, as shown, with frequent through stones.

All beds and joints of stone to be true and out of wind. The underside of steps, platforms, etc., to be pointed off square with the face. Each step to have ⅛-inch wash, and the platforms ¼-inch, or as shown on drawings.

Mullions to have copper dowels, as shown.

The window and door-sills to be bedded at ends only.

Projecting cut stone work to be properly throated underneath to throw off the water.

All copings, gables, dormers, etc., where flashing is required, to have channel for flashing cut on back, the whole being tied to the brick-work with iron cramps and doweled where required.

Finials and apex-stones to be properly doweled.

The capstone for chimneys to be of................stone, in one piece,............inches thick, perforated for the several flues.

The stone bearing-plates for the ends of the girders and trusses and capstones of basement-piers to be set to exact level required, and roughly pointed at bottom bed and sides, but cut fine and accurate on top where iron is to rest on it.

The stone-work to be properly cramped together where necessary, and anchored where required to the brick backing with galvanized iron anchors ¼ inch by 2 inches proper length.

The joints of cut-stone work not to exceed ¼ inch, the bed 3-16 inch, without undercutting, and to set with lime mortar. The joints of the exterior surface to be raked out ⅝ inch deep and filled in and pointed with lime, putty, and sand, colored to match the stone.

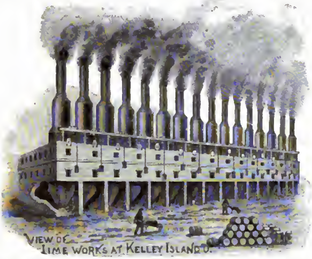
Centers to be provided and set for all stone arches, and must not be eased or struck until the mortar is thoroughly dry.

The mortar to be composed of two-thirds of clean sharp sand and one third stone lime, slacked at least two weeks before using.

Holes to be cut through stone for passage of goose-necks.

THE KELLEY ISLAND LIME INDUSTRY.

OHIO is specially fortunate in possessing an unusually rich source of natural wealth in her rock formation, valuable not only as building-stone, but for other equally important uses in the arts. Reference has often been made to the superb sandstones of the state, and of the important quarrying industries which they support. We have now to call attention to the limestone region of the northern portion of the state, which forms the basis of industrial operations on the largest scale. The limestone of this region belongs to the Devonian formation, and is that member of this formation, which is designated in the geological survey of the state as the "Corniferous." The rock is exposed in admirable condition for quarrying, upon the shores of Lake Erie, where also the situation, in respect to the shipment of the products, is most advantageous. Kelley Island, situated a short distance from the main land, is prominent as the seat of an important and growing quarry industry, and as a shipping point for immense quantities of limestone and lime. The industrial value of these limestone deposits is handsomely acknowledged in the last United States census, although since the year 1880 the industry has been vastly extended to keep pace with constantly increasing demands. From the source above named, the following information will be of interest: The lower beds of the corniferous limestone which are worked in the region above named, constitute the material of an extensive industry, the quarries being among the most important of Northern Ohio, and their location directly on the shores of Lake Erie, and the heavy stones that some of these produce, had led to a very large use of the stone, especially in the government works along the line of the great lakes. Latterly they are losing their place as building stone to some extent, but the production of lime has increased. In these quarries, the lower six or eight feet are cemented into one solid sheet, from which the large dimension stones for which the location is famous are extracted. Among the important public and private structures in this region that have been built of this stone, we may specify the heavy stone of Sault Ste. Marie canal, the Northern lighthouses, the Detroit and Cleveland water works. The admirable wearing qualities of the stone is amply shown by the condition of many of these structures after years of exposure.


VIEW OF
LIME WORKS AT KELLEY ISLAND O.

The material of these deposits is described in the official reports upon the geology of the State as a magnesian limestone. We append an analysis of the stone, made by J. Lang Cassels, which exhibits its extreme purity. It will be observed that the figures show the rock to contain slightly more than 99 per cent. of lime and magnesia carbonates, and less than 1 per cent. of foreign matter, silica, the chief impurity, being present in a mere trace. The almost absolute chemical purity of the stone—notably its freedom from metallic sulphides (pyrites), grit and earthy impurities, explains the reason of its admirable qualities as a furnace flux and as a building lime, for both of which uses it has acquired a high reputation. The figures are as follows:

Moisture	0.80	per cent.
Silex	0.05	"
Organic matter	0.01	"
Carbonate of lime	85.14	"
Carbonate of magnesia	14.00	"
Total	100	per cent.

The excellent qualities of this stone for the uses just spoken of have long been known, as the following reference to the material from the census of 1880 will attest: "The block-stone proves to be the source of excellent lime, which has long been used, but which of late has been more abundantly produced. All of the waste material is used for this purpose, and nothing remains in the quarries except flint nodules. Modern kilns of the best construction are attached to some of the quarries. Part of the thin stone goes to Lake Superior for furnace flux, where it is highly esteemed, and a large trade in the lime has been built up at Duluth and in the Northwest, and the best stone in the quarries is being burned. Much of the stone is shipped to other points to be burned, and all along the lakes are kilns which are supplied from Kelley Island.

The largest quarries and lime burners of this region, and probably the largest individual manufacturers of quicklime in the United States, is the Kelley Island Lime & Transport Company, whose quarries, as is indicated by the name, are located at Kelley Island, one of the islands of Lake Erie made historic by Commodore Perry's great naval victory in the war of 1812. The stone obtained from these extensive quarries possesses in the highest degree the excellent qualities as a furnace flux and for building purposes that have made its reputation. For furnace purposes, it is claimed to have no equal as a flux; and for plastering its notable strength and covering quality have made it greatly sought after by plasterers and builders far and near—from New York to Helena, Montana Ter., whither it is transported. To keep pace with the growing demand for its products, the company has built an extensive packet dock similar to the iron-ore dock at Ashland, which affords facilities for loading 5,000 tons of stone per day. The stone trade, it may be noted, is a branch of the company's business that is even more important than its lime trade. An idea of its magnitude of operations will be had from the statement that its annual output of stone equals 200,000 tons; and its annual output of lime, 500,000 barrels. To provide adequate facilities for handling this enormous product, the company has its own railway, some two miles in length; ships its products on its own steamers, of which it has five plying the great lakes; has, in addition, extensive lime kilns of approved modern construction at Kelley Island, Duluth, Minn. and Cleveland, O., and controls terminal facilities at Buffalo. Our illustration will give the reader an idea of the appearance of a battery of this company's improved kilns, which afford not only a far more uniform quality of lime than the crude kilns in common use, but of vastly greater output.

The main office of the Kelley Island Lime & Transport Company is located at Cleveland, O. The officers of the company are, M. C. Younglove, president; Caleb E. Gowen, first vice-president, treasurer and general manager; and Dwight G. Cutler, second vice-president and assistant manager. The company has branch offices at Buffalo, N. Y.; Detroit, Mich.; Duluth, St. Paul and Minneapolis, Minn.; and has just opened a branch in New York City, under the charge of McIntyre & Rewiden.

PRICE CURRENT.

ARTIFICIAL STONE.

(C A Stevens, Lansing, Mich.)

Sq ft

Sidewalks ... 15½c
Building stone, plain ... 20 c

BLUE STONE.

New York ... 45c
Wyoming Valley ...

BROWN STONE.

(All quotations f. o. b. quarry, unless otherwise mentioned.)

Cu. ft.

Carbondale, light ... 70c. f. o. b. quarry
" dark ... 95 " "
Hummelstown ... 45 " "
Lake Superior ... 100 " Chicago
Trenton ... 50
Ohio ... 35
Linden ... 80

CONNECTICUT—

(Middlesex Quarry Co., Portland.)

Cu ft.

Blocks, promiscuous sizes ... $ 95
Blocks, No. 2 promiscuous sizes ... 85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions ... 85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions ... 90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions ... 95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft. and over, price to be agreed upon.

Superficial

Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft long, promiscuous sizes ... 63
Platforms, Cornice, etc., 7 to 8 in. thick, under 16 superficial feet ... 85
Platform, Cornice, etc., 16 and under 24 superficial ft. 1 00
" " etc., 24 " " 32 " ft. 1 12
" " etc., 32 superficial feet and over, price to be agreed upon
Area Ashlar, under 4 in. thick ... 20
Flag ... 30
Window Stuff, promiscuous sizes ... 40

Lineal.

Water Table, 7 to 8 in. square, promiscuous lengths 40
Area Steps, 10 to 16 in. wide, under 5 ft. long, promiscuous lengths ... 50
Coping, 12 by 6 in. promiscuous lengths ... 63
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long ... 85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long ... 95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long ... 1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon
Monumental Stone, under 10 cu. ft. ... 1 30
" " 10 and under 20 cu. ft. ... 1 50
" " 20 cu. ft. and over, price to be agreed upon.
Monumental Stone, 8 to 12 in. thick, charged 12 in.
Sockets, under 12 in. wide, and under 8 in. thick ... 30
" under 14 in. wide, and under 10 in thick ... 58

Discount 5 per cent.; cash or approved Notes, at two months.

(Chas. W Stearns, Cleveland, O.)

Brown stone ... 75c f. o. b quarry.

FREESTONE.

New Brunswick brown ... 45c
Buena Vista ... 40
Ohio ... 30
Long meadow ... 60

GRANITE.

Westerly ...
Monson ...
Woodstock ... 50c
Mica Stone ... 50
Port Deposit ... 40

GREEN STONE.

Pennsylvania ... 50c

LIME, CEMENT, ETC.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs ... $ 28
" " " new barrels per barrel ... 95
Newark plaster paris, or stucco, " " ... 2 25
Michigan " " " " " " ... 2 25
Louisville cement, " " ... 1 50
" " in paper sacks, per sack ... 50
Portland " imported, " barrel ... 5 75
White sand, (New Orleans) " " ... 3 00
Plastering hair, washed, in 1 bushel papers, per bushel 30
" " limed, " 1 " " " " 35
Fire brick Savage per 100 ... 5 00
" " Aetna " " ... 4 00
" " Montezuma " " ... 5 50
" " West Virginia " " ... 3 00
Ground fire clay, best, per bushel ... 1 00
" " " common " " ... 75

Discounts

Vitrified sewer pipe, ... 50 per cent.
Flue Pipe, for Chimneys ... 25 " "
Terra Cotta Chimney Tops ... 25

LIMESTONE.

Cu. ft.

Salem, Bedford ... 25c f. o. b. quarry.
Oolitic, " buff ... 25 " "
" " blue ... 35 " "
Oolitic Bowling Green ... 25 " "
Artesian ... 35 " "
Grafton ... 35 " "

MAGNESIAN—

(J. A. Green, Stone City Iowa.)

Dimension Stone.—(First Quality of all ordinary sizes.)

12 inches and over, per cubic foot ... $ 35
11 to 12 inches, per superficial foot ... 30
9 to 10 " " " " ... 27
7 to 8 " " " " ... 25
6 inches, per superficial foot ... 20
5 " " " " ... 17

Vault covers—(Large size.)

7 to 8 inches thick, per square foot ... $ 30
6 to 7 " " " " " ... 25

Flagging Stone—(Ordinary size.)

5 inches thick, per square foot ... $ 17
4 " " " " " ... 13
3 " " " " " ... 10

Bridge Stone.

Common, per cubic yard ... $ 2 50
Coppings, " " " ... 3 75
Pedestal Bases, per cubic yard ... 6 75

Footing Stone.

Dimensions, per cubic yard ... $ 3 25
Common, " " " ... 2 50

Rubble or Building Stone.

Common Rubble, Per 100 lbs ... 2½c
Select Rubble, " 100 " ... 3½
Block Rubble, " 100 " ... 4
Drilled Rubble, " 100 " ... 6

Street Crossings.

5 to 6 inches, per superficial foot ... $ 15
Curbing, 5 to 6 inches thick, per superficial ft. ... 15

Cut and Rubbed Stone—(Finished Ready to lay in their place.)

Ashlars per sq. ft measuring all that shows ... $ 60
Base ... 70

Corner Blocks

Platforms, per superficial foot ... 60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts. per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts. extra per superficial foot.

Rough Stone.

Mill Blocks as quarried, per cu ft ... 25c
Dimension Mill Blocks, per cu. ft ... 30
Monument and Headstone Bases, per cu. ft ... 35
Extra Clear Stone for Statuary, etc ... 50
All Bases less than one cubic foot each ... 30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot ... 8
Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft ... 15c
Promiscuous good select Bridge Stone, cu ft ... 10
Common Bridge Stone Backing ... $7 per car.
Common Rubble, all sizes, ... 5 " "
Good Range Rubble, from 3 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 2 per ct., on rough and dimension, and 5 per ct. on sawed.

JOLIET ... Rubble, $6 cord; dimension 30c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks ... 25c
Dimension ... 35
Monumental ... 40@65
Sawed ... 50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks ... 25c
Dimension ... 35
Monumental ... 40@65
Sawed ... 50@100

(H. Dearborn & Son, Stone City, Iowa.)

Dimension Stone Drilled to Given Size.

Per Lineal Foot, f. o. b.

Water Table, 11 and 12 inches thick ... 35c
" 9 " 10 " " ... 30
" 7 " 8 " " ... 28
" 6 " " ... 25
Belt Course, 5 to 7 inches thick ... 25
Window Caps and Sills ... 25

Dimension Stone in Large Pieces.

12 inches thick and over, per cubic foot f. o. b. ... 35c
11 and 12 inches, per superficial foot f. o. b. ... 30
9 " 10 " " " " ... 27
7 " 7 " " " " ... 25
6 " " " " ... 20
5 " " " " ... 17
4 " " " " ... 12
3 " " " " ... 10

Rough Flags, promiscuous sizes, all shapes, per carload ... 25 00

Ashlar all Lengths.

11 and 12 inches thick, lineal ... $ 25
9 " 10 " " " ... 20
7 " 8 " " " ... 17
Bridge Stone, per cubic yard ... 2 50
Footing " " " " ... 2 25
Dimension Footings per foot ... 15
Bridge Coping and Pedestal, per cubic foot, ... 25
Street Crossings and Curbs, per superficial foot 20
Block Rubble drilled, per 100 lbs ... 8 Cents
Heavy Block Rubble, per 100 lbs ... 4 Cents
Select Rubble, per 100 lbs ... 3½ Cents
Common Rubble, per 100 lbs ... 2½ Cents
Riprap, per carload ... 1 50

Flagging Cut Ready to Lay Down.

7 and 8 inches thick, per superficial foot ... 35c
6 " " " " " ... 30
5 " " " " " ... 22
4 " " " " " ... 17
3 " " " " " ... 14

Cut Stone.

Window Caps and Sills, per lineal foot ... $ 50
Window Caps and Sills, over one foot wide, per superficial foot ... 50
Water Table, 11 and 12 inches, per lineal foot ... 1 00
" " 9 " 10 " " " " ... 75
" " 7 " 8 " " " " ... 60
Door sills, platforms and steps, per superficial foot 60
Frieze Course, per superficial foot ... 60
Ashlar, per superficial foot ... 50
Corner Blocks, plain, per superficial foot ... 75
" " rustic " " " ... 85
Bases, per superficial foot ... 70
Circular and Segment Caps, outside measure, per lineal foot ... 75
Circular and Segment Caps, beveled and scotia, per lineal foot ... 1 00

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure ... 35c
9 " " superficial " ... 30
8 " " " " ... 28
7 " " " " ... 26
6 " " " " ... 25
5 " " " " ... 20
4 " " " " ... 15
3 " " " " ... 12

Lineal measure.

Stone 9x9 ... 25
Stone 9x8 ... 24
Stone 9x7 ... 22
Stone 9x6 ... 21
Stone 9x5 ... 19
Stone 8x8 ... 22
Stone 8x7 ... 21
Stone 8x6 ... 20
Stone 8x5 ... 18
Stone 7x7 ... 20
Stone 7x6 ... 19
Stone 7x5 ... 17
Stone 6x6 ... 17
Stone 6x5 ... 17
Range Stone 12 inches thick ... 22
" " 10 " " ... 18
" " 9 " " ... 16
" " 8 " " ... 14
" " 7 " " ... 13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure ... 12½
7 to 9 " " " " ... 10

The above drilled to size one way only.

Dimension Footing.

10 to 12 inches thick superficial measure ... 15
7 to 9 " " " " ... 12

Drilled to size both ways.

Bridge Stone.

$3 to $4.50 ... per cubic yard.

Rip-Rap.

$1 to $2 50 ... per car load.

MARBLE.

(Toledo Marble Co., Toledo, O.)

RUTLAND MARBLE—

1888	Superficial						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	2½ in.	4 in.	Monumental
Statuary	93	1 19	Same as 1¼ inch	1 42	2 12	2 84	8 90
No. 1	78	94		1 17	1 75	2 34	6 90
Average	63	74		82	1 22	1 64	5 65
No. 2	43	49		62	92	1 24	4 65
Rutland Italian	33	39		62	92	1 24	4 65
Mottled Smith	...	......		47	70	94	3 90
Best No. 3	30	36		42	63	84	3 40
No. 3	21	26		32	47	64	2 40
Extra dark and mottled blue	43	54		67	1 00	1 34	8 90
Dark blue	31	39		57	85	1 14	3 90
Light blue	23	29		37	56	71	2 90

Hearths, 1 in., sawed edges, per sup. foot ... $ 24
No. 3 Base strips and posts, cubic foot ... 1 90
Inferior No. 3 posts and strips " ... 1 65
" No. 3 bottom bases " ... 1 65
" No. blue posts, strips and bottom bases ... 2 15
Markers, assorted sizes, 10 to 14 in. long, 2 in. ... 70
" " " 4 " ... 1 00
Footstones, 5 to 8 in., each ... 30
" sawed heads, each ... 32
" " sand rub and box ... 38

ITALIAN MARBLE—

Cu. ft.

Monumental stock ... $4 75
Slabs over 2 in. thick, full size of block ... 4 25
" 2 " cut to size ... 4 75

Superficial—

	Full size.	Cut to size.
¾ in. slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

SUTHERLAND FALLS MARBLE—

1888	Superficial.						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental.
Mourning veins	53	66	87	92	1 28	1 84	5 40
No. 1	48	59	82	87	1 30	1 74	4 90
Average	38	49	62	67	1 01	1 34	3 90
No 2	28	34	42	47	70	94	3 15
Best No. 3	23	29	35	37	55	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 2 Base Strips and Posts, per cubic ft.	$1 90
Inferior No. 3, Posts and Strips, per cubic foot	1 65
Inferior No. 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 12 to 14 " " 4 " " "	70
do 16 to 16 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 2 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup. ft	34

MOUNTAIN DARK MARBLE—

1888	Superficial.					Cu.
	¾ in.	1¼ in.	2 in.	3 in.	4 in.	Monumental.
No 1	3	74	1 07	1 60	2 14	5 90
Average	48	64	87	1 30	1 74	4 90
No 2	38	49	67	1 01	1 34	3 90
No 3	25	34	52	78	1 04	2 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No 3, Strips and Posts, per cu. ft.	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in Inches.	Diam. Bowl in Inches.	Rutland Average. S. F. D. M. V. Mount Dk. No.1.	R'l'd No.3 ex.dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No 2.	Rutland Best No. 3 Sutherland Falls No. 3 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue. Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	2 40
8	5	2 95	2 85	2 75	2 65	2 55	2 65
9	5	3 15	3 05	2 95	2 85	2 75	2 75
10	5	3 35	3 25	3 15	3 05	2 95	2 90
10	6	3 80	3 60	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	3 95	3 70	5 50
14	6	4 80	4 50	4 20	4 00	3 90	5 70
12	7	5 15	4 85	4 55	4 35	4 15	5 75
13	7	5 35	5 05	4 75	4 65	4 35	6 25
14	7	5 65	5 25	4 95	4 65	4 45	6 50
15	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	6 65	5 35	5 06	4 85	7 00
14	8	7 10	6 60	6 20	5 80	5 60	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 00	7 40	6 90	6 40	6 00	8 90
16	9	8 80	8 10	7 50	7 00	6 60	9 50
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 50	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 50
18	10	11 35	10 35	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 25	14 25
24	10	13 75	12 45	11 35	10 85	9 55	15 75
18	11	13 75	12 55	11 85	10 65	9 95	15 85
20	11	14 55	13 25	12 15	11 15	10 35	15 85
22	11	15 35	13 95	12 75	11 65	10 85	16 85
24	11	16 25	14 65	13 35	12 13	11 25	17 85
18	12	15 85	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 85	17 95
22	12	17 75	16 05	14 55	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 35	13 15	......
28	12	20 65	18 45	16 65	14 95	13 65	......
24	13	21 20	19 00	17 10	15 50	14 20	......
26	13	22 80	20 10	18 00	16 20	14 80	......
28	13	23 80	21 20	19 00	17 10	15 60	......
30	13	25 00	22 30	19 90	17 90	16 30	......
24	14	25 80	23 20	21 00	19 10	17 00	......
26	14	27 40	24 70	22 30	20 30	18 70	......
28	14	29 20	26 20	23 60	21 40	19 70	......
30	14	30 90	[illegible] 70	24 90	22 50	20 70	......
32	14	32 70	[illegible] 90	26 20	23 70	21 80	......

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " " small lots,		12
Sponges	per lb.	75
Red Grit	"	05
Nova Scotia Blue Grit	"	05
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

TOOLS—

¼ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	33
Frosting Tools	per doz.	3 00
⅝ in. Granite Lettering Tools	"	2 50
¾ " " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mesh "	" 2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	2 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb.	each,	$ 50
3 to 5 lb.	"	75
5 to 7 lb.	"	1 25
8 lb. and up	"	1 50

SPECIALS—

Diminished Dies, extra .... per cubic foot	50c
Strips ordered 7 ft. long and over, extra per cubic foot.	50
Sawing edges slabs, 1 inch thick per superficial ft.	03
" " " 2 " " " "	05
" " " 3 " " " "	08
" " " 4 " " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock .... per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths .... per surface foot rubbed	05

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 3 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 34 000 pounds or more in one order.

	Cu. ft.		
Tennessee Red	$2 50@$3 00	f. o. b.	Chicago
" Knoxville	3 00	"	"
Vermont White	2 50@ 3 00	"	"
Ophite	4 50@ 5 00	"	"
Armodite	1 50	"	"

MACHINERY.

STEAM PUMPS—	Discount
Smedley's	25 per ct.

WINDMILL PUMPS—

Keokuk W. E. Co. .... 40 per ct. discount 5 per ct. cash.

BRICK MACHINES—

Quaker—horse power	$300 net
steam "	400 "
extra heavy "	595 "

PULVERIZERS—	Discount
Cyclone	20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete	$100

EXCAVATORS—

Little Giant	$4,300
Railroad Giant	6,500

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis)

	Discount
Iron	33⅓
Steel	37½
Gal. Iron	33⅓

(Washburn & Moen M'f'g. Co.)

Iron	33⅓
Steel	37½
Gal Iron	33⅓

BLOCKS AND TACKLE—

(Toledo Block Works.)

Thick Mortise Blocks	Single	Double	Triple
8 inch Iron bushed	2 40	4 50	6 30
10 " "	3 30	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	5 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	29 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	13 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00

Discount 35 per cent.

Wrought-iron Tackle Blocks	Single	Double	Triple
6 inch	1 40	2 25	2 75
8 "	2 40	3 50	4 50
12 "	4 55	8 10	10 40
16 "	9 55	15 70	22 00
20 "	22 00	31 40	50 00

Iron-bushed, discount 20 per cent; roller bushed discount 10 per cent

(Detroit Block Works.)

Discount from list .... 40 per ct.

BELTING-RUBBER—

Standard	60 per ct. and 10 per ct.
X quality	50 " " 10 "

WROUGHT-IRON PIPE—

(American Tube & Iron Co.) Discount

Butt weld black	55 per ct.
" " galv.	45 "
Lap " black	65 "
" " "	65 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.) Doz.

Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	33 00

VITRIFIED STONE DRAIN TILE—

(Bennett Sewer Pipe Co., Jackson, Mich.)

2½ inch per 1,000 feet	$ 12 00
3 " " " "	17 00
4 " " " "	26 00
5 " " " "	36 00
6 " " " "	46 00
8 " " " "	90 00
10 " " " "	145 00
12 " " " "	180 00

RED SANDSTONE.

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	60c
Dunreith	50c
Darlington	40
McArthur	45
Carlisle	65
Potomac	50

SLATE.

	Square.		
Vermont Red	$13 50	f. o. b.	Chicago.
" Purple	5 50	"	"
" Green	3 50	"	"

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

	Square	
7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x15, 15x20	2 65	"
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont Slate Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 75	" "
Maine	5 50@5 80	" "

BLACK—

(Michigan Slate Co., Lansing.)

Michigan .... $5 50 f. o. b. quarry

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft. f. o. b.
No. 1 Promiscuous block	50c
No 2 " "	40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	40c
No. 2 " "	30
No. 1 Monument Bases, broken to size	45
No. 2 " " " "	35
Pier Blocks " "	20

SPLIT PLATFORMS—

	Superficial feet. 5 in.	12 in.
No. 1 Buff Amherst	25c	60c
No. 2 " "	20c	50
No. 1 Berea or Blue Amherst,	20c	50
No. 2 " " "	17c	40
No. 3 " " " (for sidewalks)	12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—

	Cu. ft.
Promiscuous Blocks	15c

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 6 " "	09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	25c
6 " " "	46
9 " " "	68
12 " " "	88
3 in. Berea or Blue Amherst	21
6 " " " "	41
12 " " " "	77

SAWED PLATFORM—

	Sq. ft.		Sq. ft.
Buff Am. 6 in. No. 1.	46c	No. 2	40
" 8 " "	60	"	53
" 10 " "	73	"	67
" 12 " "	88	"	78
Berea or Blue Amherst 6 in No 1	41	"	36
" " 8 " "	53	"	48
" " 10 " "	65	"	59
" " 12 " "	77	"	67

BEREA AND BLUE AMHERST SAWED FLAGGING—

	Sq. ft.
2 inches thick	10
2½ " "	12
3 " "	14
4 " "	18

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—

	Cu. ft.
No. 1	30c
No. 2	25

(French Fort Quarry, New Castle, N. B.)

	Cu. ft.
Olive	40c f. o. b

(Babbitt Sandstone Co., Ypsilanti, Mich.)

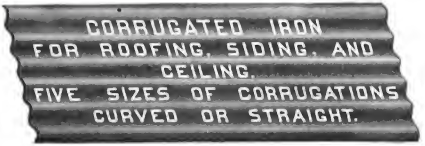
	cu. ft.
Brown Sandstone	25 f. o. b quarry

(Lake Huron Stone Co., Detroit, Mich.)

Blue Sandstone	30c f. o. b.

THOMPSON MANUFACTURING COMPANY,

Cleveland, O.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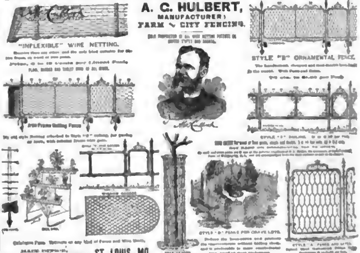
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Subscription price $3.00 per year. Single numbers 35 cents.

A limited number of suitable advertisements will be received. Address correspondence to any of the editors, or to

THE AMERICAN GEOLOGIST, Minneapolis, Minn.

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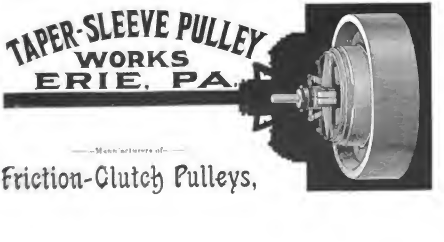

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STONE.

VOL. I. INDIANAPOLIS, IND., JUNE, 1888. NO. II.

STONE

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

PUBLISHED MONTHLY BY

THE D. H. RANCK PUBLISHING CO.

(INCORPORATED.)

D. H. Ranck, Pres't and Treas. A. K. Hollowell, Vice-Pres't.

Louis H. Gibson, Sec'y.

Office: News Building, near corner of Washington and Illinois Streets.

SUBSCRIPTION PRICE, - - - - $2 A YEAR, IN ADVANCE.

D. H. Ranck, - - - - Managing Editor.

L. H. Gibson, - - - - - - - - Editor.

Marcus Gardiner, - - - Manager Advertising Dep't.

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TO THE TRADE.

IN order for this journal to be the success that we wish it, it must be of distinct benefit to its patrons. All affairs are more or less mutual. This is a journal of stone, marble and granite. It is a means of communication between the various branches of trade the users of stone, those who quarry it, those who buy and sell, and as well to those who furnish supplies to the various departments of the business. The granite worker or the granite quarrymen of New England have a constantly increasing business in the West. The West has a constantly increasing business in the East. A great many quarries are seeking development. More stone would be used in building operations if knowledge in regard to it were more fully disseminated. People who handle stone in building are doing it in a more artistic manner than in times past. Stone from different states come together in the same building because they represent different colors and textures which are necessary to the fulfillment of an artistic idea. In single buildings in this city, Pennsylvania, Massachusetts, Ohio, Minnesota, and as well our own state are represented in an agreeable combination of stone, and other building material. Knowledge is all that is necessary to make this sort of thing more general. This is a part of our business. In the spreading of this knowledge we must have help, not money, particularly, we will take care of that, but knowledge. The stone interests of the country are not developed to a very great extent, comparatively speaking. In some instances where it is locally known it is not generally developed. Quarries of particular value in one section are unknown in another. A stone product which could be used to advantage in the West is produced, say in the East without the knowledge of the West. We wish the help of the quarrymen the producers; we wish descriptions of their quarries; we wish that which will bring the knowledge desired to all alike, and in a form for practical use.

We are led to use considerable of our space on this page with respect to our business with this paper. It is the only means we have of reaching a very large number of people with whom we would wish to do business in one form or another. As we have said before, all affairs are more or less mutual. In order to make a paper which has a wide interest, the matter which it contains must be of a cosmopolitan character. In order to be cosmopolitan, it must be mutual. We wish correspondents in all sections of the country. We wish each section to feel and know that it is fully represented. Our field as a trade journal, being as it is new of occupation, we must make known our wonts. It is to be remembered that matter which may be stale and unprofitable in one section is of great interest and benefit to another. Granite information or news may not in any sense be profitable in one section, yet pleasing and profitable to many others. One can best tell what is suited to the requirements by considering in a broad way the class of matter which is most interesting to himself and furnishing that which comes within the range of his own interests. All this may be said with respect to correspondence. This and more may be said of matter in general. It is a good principle to bear in mind in preparing matter for publication that one should write only about that with which he is familiar. This statement might appear unnecessary were it not for the fact that a great many are disposed to take up things strange to themselves. We wish matter from sources directly connected with the trade, of a practical character. We want something which is of use to people in business. We wish something in which there is money, something that is available in a practical way. Theoretical or speculative matter has no place in this paper. Any one who desires to furnish matter for publication can adopt one of two courses in sending it: either mark the price that he wishes for it, or indicate a disposition to accept our judgment as to its value. We will undertake to do the right thing.

A GREAT deal of time and money is wasted in all lines through a lack of system and intelligent method in the handling. For instance, take the stone business in all its details. New quarries are constantly being opened. Those which are relatively inferior frequently take an advanced position because of the business push and system which is behind them. Others, superior in many ways, suffer because of narrowness, ignorance or parsimony. This can be illustrated in a broad way by considering the condition of the stone interest of the country at large. There are a few organizations which are doing a profitable business. The business is being worked for all it is worth. But generally speaking there is less real business ability exercised than is in keeping with the importance of the trade. We can only make this suggestion in a comparative way. The statistical stone information is meagre. This is true because of the state of the organization of the stone business in detail. A list of the stone quarries of the country which is in any way satisfactory has never been made. If the business in general were in a more advanced state every one's business would be in a more profitable condition. Anything which will lead to public knowledge in respect to stone in all its details will lead to its larger use. Knowledge is one of the things which is necessary to this enlargement.

CORRESPONDENCE.

CORRESPOND WITH US!

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

[Regular Correspondence.]

Buffalo, N. Y.

Buffalo's building boom seems to have struck shallow water, at least from the stone-cutters' point of view. Dull is the word all along the line. Such is the response your correspondent meets with wherever a question is put concerning the state of trade. True, there is a moderate amount of work being done this spring in the building stone yards but not what we would expect of a city of a quarter of a million inhabitants who are said to be the proud possessors of a full-grown boom. But boom it is, and whether it be possible presidents, building lots, or harnessing Niagara our citizens have made up their minds to "git thar" and no doubt they will, but in the meantime, our stone-cutters have some cause to grumble since there are not much over one-half the work being done that there was at this time a year ago. Doubtless, "presidental year" has more or less to do with this state of affairs in the stone trade, as in all other industries, but I think the causes are more direct, and can in most cases be placed between the architect and his patron. I think our citizens and corporations who build large and fine structures are over-slow to appreciate the superiority of stone over all other material for fine buildings.

There is no reason why Buffalo, situated as it is in close proximity to quarries, capable of affording an unlimited supply of the finest building stone in the world, should not have as many, if not more fine stone buildings than any city of its size in this country.

The wisdom of building, if possible, entirely of stone, was fully demonstrated in the recent fire at St. Paul's Cathedral. For hours there raged within the walls of that once beautiful edifice the fiercest fires, and yet they stand there to-day almost intact and a monument to the indestructibility of stone as compared with other materials. In strong contrast to this may be cited the fire in the beautiful but frail Barnes & Hengerer block. Within half an hour from the sounding of the fire alarm, the block was in total ruin and the iron of which its entire front was built instead of affording any protection from the dread element, but served to hurry it to its doom, and I may remark, by the way, that the owners are re-building after apparently the same plan, which goes to show how little effect such an example has upon some minds. But the neighbors over the way, who suffered from the intense heat thrown off by the molten metal, might have something to say if questioned on the subject.

It seems too bad that the designer of the Buffalo Young Men's Association building (who by the way was not a Buffalo man,) could not have worked a little more stone into that same structure. With its holiday dress of terra cotta it looks too nice to be real, and the same artist, when the bids for the new "Richmond" were found to exceed the limited price, saw fit to economize in the matter of stone-work when the bids for the same did not reach $35,000 out of over half a million allowed for the cost of construction.

We live in hope of a new postoffice in the near future and that will probably be entirely of stone.

What has been said of the state of the building trade will apply also to monuments. Monumental dealers and their agents reaped a golden harvest in the year past, or should have done so at least, for they sold work enough. But now the erstwhile smiling "agent" stands on the corner, chewing the cud of reflection, or the corners of his moustache, and wondering where are all his last year's customers; and the customers in many instances are chewing a very different kind of a cud and wondering at many things. We have some theories of our own concerning some of these things which we shall air for the benefit of the readers of STONE at some future writing.

There are few monuments of consequence spoken of this season. There is considerable talk, which may develop into something definite, by next writing.

Respectfully, P. A. ROCHE.

Buffalo, N. Y., May 25.

A Kindly Criticism.

To the Editor of STONE.

SIR: I have received No. 1 of STONE, kindly sent me by your company. I wish you a full measure of success. Your journal will have a considerable circulation among architects and engineers if you keep the literary quality of the work up to a fair standard, and at the same time give evidence of good judgment in matters of taste. Your circulation with the trade will, presumably be large; and perhaps you will not care to aim above the natural mark of a commercial journal. That matter is, as you will no doubt, remark, your affair; still, as having a friendly interest in your undertaking I venture to suggest that your paper will be none the less valuable as a commercial paper if its editorial utterances indicate the existence of well-trained critical ability in the manager's office.

American taste, as demonstrated by American works of art, architectural and other, is but little advanced beyond that of barbarous nations. You have an opportunity for exercising a wholesome influence upon the sentiment of the people in this regard, and I trust that you will judiciously use that opportunity. You will lose nothing in consequence of honest expositions of faults in designs, of whatever sort, in which stone work is the intended medium of elaboration. On the other hand you will lose something, if not much, if you indiscriminately praise each design which shall have approval from a committee. I am lead to make these remarks through reading your unqualified approval of the design for a monument to Audubon, shown on your page 3. In my view this design is simply puerile, weak and without sentiment, tawdry and altogether ridiculous. The idea of placing a *relievo* of Audubon in the *base* of the work is, perhaps new. The base itself is apparently modeled on a pedestal, such as those on which circus men stand when holding up banners in the ring. I doubt the consent of the trustees of Trinity to the placing of the monument, constructed as per design, in their burying-ground. Still, nobody can predict the action of the present age, in matters of this sort.

As to the Indiana Monument, the design is, as you say, "exceedingly dramatic;" (using the term as suggestive, and not as a technical expression;) but it is incongruous and *bizarre*. Thoroughly artistic elaboration of the details, sculptures, etc., would largely alleviate the faults of the composition, but will that thoroughly artistic elaboration be effected? Not at a cost of "only $45,000," you may be assured! But the trouble will be that the sculptures will be horribly botched. The artist, Mr. Schmitz, will presumably, commit suicide at an early period in the progress of the work. In the matter of incongruity, how about the water-works part of the design? A miniature ocean might work in, but the water-fall feature is grotto-like, and where is Indianapolis to get the water to keep the works supplied? They will need to have an engine to pump the water in a circuit, so that only a moderate expenditure of the fluid will effect an apparently copious flow, as from a fountain-head. Let us hope however, that the sculptures will be something better than the examples of a stone soldier, seen everywhere in the United States, on soldiers' monuments, chipped out of granite by the local stone-cutter.

J. M. GOODWIN.

Sharpsville, Pa.

In the matter of the sculpture on the Indiana monument we appreciate what is said, but we judge the danger which Mr. Goodwin has in mind in the matter of the elaboration of the details, sculptural and otherwise, will be averted. We are not speaking carelessly in this matter, as we are posted as to the probable course of the committee. They are acting, if not under the instructions of Professor Ware, under the guidance of certain general principles set forth by him, particularly in the matter of the sculptural work. In the first place, Professor Ware has indicated to the committee that he does not wish to pass judgment upon this part of the work, but suggests that they appoint other competent expert authority to act with them in this matter, and if we can judge by the record of what they have done in the past, they will no doubt act wisely. As to the general architectural details, Mr. Schmitz's record and his education indicate that something respectable may be expected. As regards the cost of the sculptural work, the forty-five thousand dollar idea is no doubt developed by the architect's allowance. The committee is fully aware that this sum would not be sufficient to do the right thing, and the people of Indiana are sufficiently well impressed with what has been done to vote the necessary amount to do the best possible thing. We are inclined to believe that the architect will have no occasion for commiting suicide during the progress of or after the completion of the work, but that the people of Indiana, and those to whom they have delegated the work of building the monument, will do their part toward leading him to a ripe old age of peace and satisfaction. In the matter of the water works, we must confess that we are at a loss to comprehend the methods which will lead to the realization of the water-fall pictured in the drawing. Still this is a rich country and we hope for the best.

From Pueblo, Col.

To the Editor of Stone.

Sir: There will probably be several large buildings erected here during the coming year. Among the number will be an opera house to cost $200,000, and a union depot, cost unknown.

That Eastern capitalists have a profound belief in the future of Denver has been often evidenced by their expending large sums of money in real estate and other investments in that city. The latest development in this direction is on a still more extensive scale, and is to be found in the formation of a syndicate of Boston capitalists who have decided to erect a $500,000 office building there, eight stories in height. Work will be commenced within the next twenty days. The building will be constructed of Colorado sandstone, with granite trimmings, and will be furnished with all modern improvements. Two elevators will afford constant and rapid access to the most remote recesses of the structure. The building will be fireproof throughout. I will send you specimens of rock or marble from time to time.

Very respectfully, S. B. Lum, Jr.

Pueblo, Colo., May 17.

Kind Words from Canada.

To the Editor of Stone.

Sir: Your sample copy of Stone to hand. We are very much pleased with the appearance and contents. Certainly it must be a great benefit to the members of our craft, and if you continue to keep it as full of useful and interesting matter as the first issue, we cannot see anything but success for your paper for surely no dealer will fail to avail himself of the benefits contained in a work of that sort. We wish you all success in your enterprise, and inclose you $2 for a year's subscription.

Yours very respectfully,

The Marble and Granite Dealers' Association of Ontario.

J. W. Hutchinson, Sec'y.

Knows a Good Thing When He Sees It.

To the Editor of Stone.

Sir: I received a sample copy of "Stone;" have looked it over from cover to cover, and found more information in it about stone than anything I ever read. Inclosed please find two dollars for a year's subscription, commencing June, 1888. Yours truly, John B. Sullivan.

Taunton, Mass., May 21.

Very Much Needed.

To the Editor of Stone

Sir: We have received the initial number of your new journal "Stone" and welcome it is as a very much needed addition to the trade journals of the day. We wish you success and inclose herewith two dollars subscription fee for one year. Yours truly,

The Knox Rock Blasting Co.

Pittsburg, Pa., May 21.

It Will Grow Better Every Issue.

To the Editor of Stone,

Sir: We are in receipt of "Sone" and shall like it very much if it measures up to specimen copy. Inclose please find two dollars, subscription price. Put us on the list as one of the ten thousand. Respectfully,

New England Brownstone Co.

Cromwell, Conn., May 15. Fred'k DePeyster, Sup't.

A Really Meritorious Journal.

To the Editor of Stone

Sir: I wish to congratulate you on the beautiful appearance of your new journal "Sone." It is the first journal of the kind I have seen that really merits the attention of the trade at large. I am very truly yours,

Thos. M. Brady, Supt.

Marietta, Ga., May 19.

Much Pleased With It.

To the Editor of Stone

Sir: The first copy of "Stone" received. We are well pleased at the style, matter and general appearance of the paper.

Very truly yours, B. C. & R. A. Tilghman.

Philadelphia, Pa., May 15.

◆

The railroad excitement at Barre, Vt., is at fever heat. The Barre Railroad Company has surveyed for the road from the village to the granite quarries, as has also the Central Vermont Railroad Company, both parties being desirous of the best location at the village.

PORTLAND CEMENT IN INDIANA.

INDIANA appears to have all the facilities for producing the quality of Portland cement. Experts from Berlin, Germany, have been traveling over the state and examining the limestone from which cement is manufactured. They have made a report of their investigation to a meeting of citizens at the Board of Trade in this city. The result of their work was so favorable that the preliminary arrangements were made for the organization of a stock company, and one of the results of the visit of the foreign gentlemen to this state will probably lead to the establishment here of one of the largest cement manufactories in the world.

Mr. Spannagle and Dr. Preussner are the German experts. Mr. Spannagel said that the attention of Dr. Preussner and himself had been called to Indiana, as a field which contained the chemical qualities for the production of the best kind of Portland cement, by reports sent by the Geological Department of the state to the Berlin University. So strongly did these reports impress them that they ventured to come here and make a personal investigation, believing that if the facilities in this state should prove as superior as they had been led to believe, they would soon be amply repaid for their outlay. They have spent a month in traversing the state and making tests of the limestone and clay from which the cement was to be made. They state that along the Vincennes road, between Indianapolis and Vincennes, their tests were successful beyond all expectation, and that they were convinced that Portland cement can be manufactured from the materials found right here in Indiana that will be equal if not superior to that now manufactured in Germany, and shipped to this country in large quantities.

For the purpose of convincing those present Dr. Preussner made a test of several samples of cement that had been made in the last few days. The desirable quality in cement is always tension, and in order to test this a very novel machine, of German invention but now used extensively in this country, was brought into requisition. A test was made of pieces of cement which had lain in the water two days and of others that had been so served for three days, and in both cases the test was eminently satisfactory, the cement proving of a superior tensile quality to that elsewhere. Mr. Spannagel then showed the profit that could be derived from the manufacture of cement here. The manufacture of cement in Germany cost $1.25 a barrel; here the cost would be 83 cents. While there were at present many manufactories of Portland cement in this country they were generally understood to be all inferior qualities to that made in Germany, and accordingly the selling price of $1.68 per barrel was paid for it there, and to that were added cost of shipping, freight and import duty, until it cost the user $2.88 per barrel in this country - or $1.05 more than the cost of its manufacture would be. He said that the cost of a plant that would turn out 500,000 barrels of Portland cement in one year would be $800,000 in Germany and $500,000 here. He further stated that he was so confident of the profit to be derived from such an enterprise that he would agree to remain and superintend it upon the basis merely of a percentage on the profits.

A committee of five to investigate the feasibility of establishing a manufactory either in this city or at some point in this state was agreed upon, and it is thought the matter will take practical shape within a short time.

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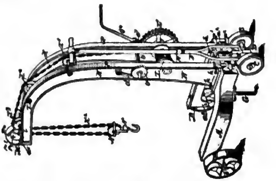
Stone is a new monthly published at Indianapolis, Ind., devoted particularly to the interests of producers, workers and users of stone. Its appearance, matter and arrangement are particularly attractive for the first number of a new paper, and it should receive the support its merit demands.—*Mining Review.*

REGENT PATENTS.

ISSUE OF APRIL 17, 1888.

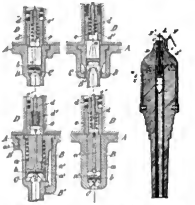
No. 381,256—Crane. David T. Lane, Franklin, Pa., assignor of one-half to D. I. Dale, same place.



CLAIM.—1. In a traveling crane, the U shaped bed-plate having curved arms secured to the rere end thereof, in combination with a lifting-tackle and winding-drum, truck-wheels journaled upon stud-axles fixed to the forward end of the U-shaped bed-plate, and truck-wheels having a crank axle pivotaly connected with the rear end of said bed-plate, substantially as described.

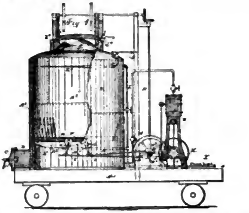
2. In a traveling crane, the bed-plate having arms projecting upwardly therefrom, in combination with the lifting-tackle and winding-drum, truck-wheels journaled upon axles fixed to one end of the bed-plate, a crank-axle and truck-wheels pivoted to the opposite end of said bed-plate, and a handle secured to the crank-axle and adapted to raise or lower and to guide the frame in its movements, substantially as described.

No. 381,264—Percussion Fuse. Wilhelm Lorenz, Carlsruhe, Baden, Germany. Filed June 22, 1887.



CLAIM.—1. In a primer for cartridges, the cartridge-case A, anvil C, cap b, resting on said anvil, and reaction-plug e, sliding within said cartridge-case behind said cap, in combination with the breech-piece D, arranged behind and in alignment with the cartridge-case, the guide-case a, sliding within said breech piece, the strong spring c', forcing said guide case forward, the striking-bolt d, sliding within said guide-case, and the weak spring d', forcing said firing-pin forward, as and for the purpose set forth.

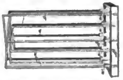
No. 381,521—Apparatus for Reducing Bituminous Rock. George E. Belmore, San Francisco, Cal. Filed Sept. 29, 1887.



CLAIM—1. An apparatus for reducing and preparing bituminous rock for the purposes herein described, consisting of a steam-tight tank, A, with an inlet in the top and a drawing off opening in the side at the bottom, which are fitted with steam-tight covers, and having its interior divided longitudinally by a grate-surface into an upper melting or reducing space, A', and a lower receiving and heating space, A^2, and having a steam coil in each space, and connection of the same outside the tank with a steam supply, as hereinbefore set forth.

2. An apparatus for reducing and preparing bituminous rock as a material for street pavement, consisting of a steam-tight tank, A, having a grate-surface composed of grate-bars to which a rocking or oscillating motion is imparted, and having in the spaces above and below said grate-surface a steam coil and connection thereof, with a steam-supply outside the tank.

No. 381,341—Paving-Block. Reynolds I. Cowden, Leetonia, O., assignor of one-half to Charles M. Schmick, same place. Filed April 22, 1887.



CLAIM—As a new article of manufacture, a paving-block consisting, essentially, of a body or backing and metal cap or head, the latter having a projecting rim or rib on the outer edge of its inner or lower face adapted to overlap the adjacent edges of the body of backing, and anchors consisting, essentially, of the rods bent into loop form and rigidly secured at their end to said inner or lower face of the cap or head and imbedded in the body or backing, substantially as set forth.

No. 381,507—Gunpowder. Chauncey J. Olds, Valley Falls, assignor to the Schaghticoke Powder Company, Schaghticoke, and the Laflin & Rand Powder Company, New York, N. Y. Filed May 24, 1887.

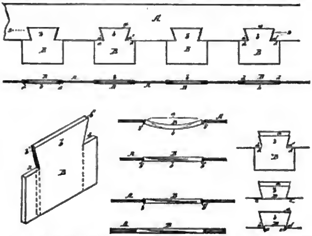
CLAIM—An explosive compound consisting of carbonized peas combined with saltpetre, sulphur and charcoal made from willow or other trees, substantially as described.

ISSUE OF APRIL 24, 1888.

No. 381,667—Concrete Pavement. George A. Bayard, Bellefonte, Pa. Filed Dec. 28, 1887.

CLAIM.—The improved concrete pavement herein described, consisting of a foundation-layer of coarse broken stone and ashes or pebbles, a second layer of broken stone, cinders, pebbles and tar, a third layer of sand, small pebbles, and coal-tar, resin, and unslaked lime, and a surface-coating of cement and sand, as described and specified.

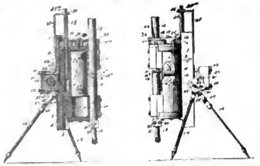
No. 381,811—Stone Saw. James Peckover, Philadelphia, Pa. Filed Dec. 7, 1887.



CLAIM.—1. The combination of a saw-blade having an undercut recess with a tooth having a correspondingly-shaped shank, forming a tongue-and-groove joint at the sides of the recess, said shank being flexible, so that it can be bent for lateral insertion into the recess and afterward spread thereinto, all substantially as specified.

2. The combination of a saw-tooth having an undercut shank and side shoulder d, beneath the same with a saw-blade having an undercut recess corresponding in shape with the shank of the tooth, the edges of which are grooved to receive the saw blade, all substantially as set forth.

No. 381,838—Rock Drill. Simon Ingersoll, Glenbrook, Conn. Filed Dec. 7, 1887.



CLAIM.—1. In a rock-drill, a cylinder closed at both ends and having a slot through one side, and a piston adapted to reciprocate in said cylinder, in combination with an independent drill-bar and a carrier for said drill-bar, whose shank passes through said slot and engages the piston.

2. The cylinder closed at both ends and having a slot in one side, and a piston adapted to

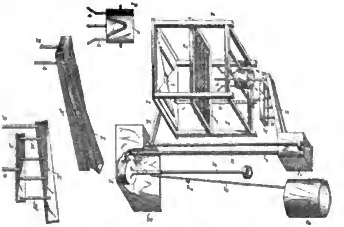
reciprocate in said cylinder, in combination with an independent drill-bar and a carrier having arms which embrace the drill-bar, and a shank which passes through the slot in the cylinder and engages the piston.

3. The frame work, the carriage, and a cylinder upon said carriage closed at both ends and having a slot, 18, in combination with a drill-bar journaled in said carriage and having a groove, 15, and a carrier having arms which engage said groove, and a shank which passes through said slot and engages the piston, said groove being wider than said arms, so that the drill-bar can continue its stroke after the return movement of the piston has commenced, enabling the drill to strike the rock with full force before the carrier comes in contact with the upper side of the groove.

7. In a rock-drill, an automatic feed consisting of a screw attached to the frame-work, a ratchet upon the carriage internally threaded to engage the screw, a reciprocating arm, 165, a rock-shaft, 38, having arms 37 and 41, one of which is engaged by arm 165, and the other carries a spring-pawl engaging the ratchet, whereby each downward movement of arm 165 carries the ratchet forward and moves the carriage downward.

ISSUE OF MAY 1, 1888.

No 381,999—Method of and Apparatus for Feeding Chilled Shot in Stone-Sewing Machines. Eli J. Hawley, Manchester, Vt. Filed July 30, 1887.

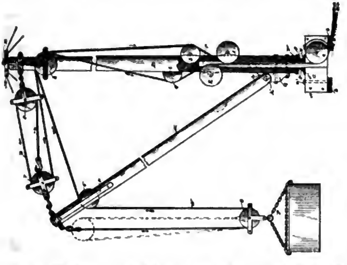


CLAIM.—The method of feeding chilled shot to a stone-sawing machine, consisting in discharging the shot from the reservoir mixed with a sufficient quantity of water to carry them down the feed-trough, gradually diminishing the quantity of water after it leaves the reservoir and while flowing through the trough, and finally discharging the shot and the reduced quantity of water onto the stone.

2. In a stone-sawing machine, the combination, with the gang frame and a reservoir for mixed chilled shot and water, of a feed-trough provided at its lower end with a discharge-pipe, the said trough being constructed and arranged, substantially as described, so as to retain the shot while flowing through it, and to gradually discharge a quantity of the water after it leaves the reservoir and while flowing through the trough.

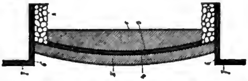
3. In a stone-sawing machine, the combination, with the gang-frame and a reservoir for mixed chilled shot and water, of a feed-trough provided at its lower end with a discharge-pipe, a water box beneath said trough, a series of drain-pipes whose upper ends extend through the bottom of the feed trough on different levels, and whose lower ends extend into the water box, and a pipe leading from said box to the bottom of the gang-frame, substantially as described.

No. 381,141—Derrick. D. Henry Cram, Boston, Mass. Filed Jan. 12, 1888.



CLAIM—The combination, in a foot-block of a derrick, of the beams bolted side by side and provided with sheet metal on their continuous sides the skids having curved ends secured to the under side of said beams and projecting beyond the same at each side, the metal plate rigidly secured between said beams, and the sheaves journaled between said late and beams, substantially as described.

No. 382,153—Method of Paving Streets and Roads. Patrick Griffin, Utica, N. Y., assignor of three-fourths to James F. Leahy Edward Callahan, and John Hackett, all of the same place. Filed Oct. 3, 1887.

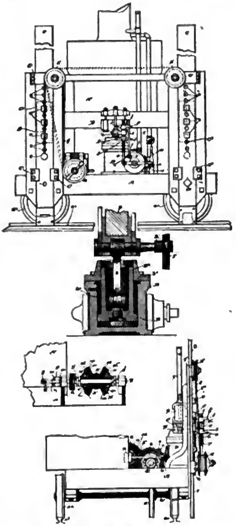


CLAIM.—A roadway constructed by moistening and compressing the earth or clay into a convex surface, covering the same with a layer of water-tight felt or covering, and having a depressed ditch filled with loose stones at each side and the whole covered with a layer of hard wearing-surface.

2. A roadway consisting of successive layers of moistened and compressed earth, clay, or sand covered with a layer of felt, having a depressed ditch filled with loose stones at each side, and the whole covered with a layer of water tight wearing cement.

ISSUE OF MAY 8, 1888.

No. 382,528—Stone-Channeling Machine. Josephus F. Holloway, New York, N. Y. Filed Sept. 21, 1887.



CLAIM.—1. The combination, with tilting lever and upright channeling-bars connected with the respective ends of the lever, of trunk-engines for operating the level and channeling-bars, said engine being connected with the lever between the channeling-bars, and suitable means for holding stationary one channeling-bar while operating the other channeling-bar, substantially as set forth.

2. The combination, with tilting lever and channeling-bars connected with the respective ends of the lever, of wrists connected with the respective channeling-bars for attaching to the lever, said wrist being adjustable lengthwise of the channeling-bars, and a steam-cylinder for operating the lever, substantially as set forth.

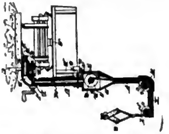
3. The combination, with channeling bars and trunk-engine located between the bars for operating the latter, of tilting lever, the latter being connected at the ends thereof with the respective channeling-bar and connected at the central portion of the lever with the engine for operating the same, and suitable means substantially as indicated, for fastening the one channeling-bar to furnish a fulcrum for the lever in operating the other channeling-bar, substantially as set forth.

6. The combination, with steam-cylinder, channeling-bars, and tilting lever, substantially as indicated, a sleeve connected with the lever, a valve-rod made to slide through the sleeve, said rod having tappets mounted thereon, respectively above and below

the sleeve, of a locking bar for the tappets, said locking-bar being pivoted at the one end and provided with friction-disks at the pivotal bearings, substantially as set forth.

7. The combination, with bevel twin gears and driving-pinion simultaneously engaging both gears, the system of gearing having shrouding to hold the twin gears to the pitch-line as against pressure from without, of shaft, sleeve journaled on the shaft, the twin gears being journaled on the sleeve, and the collars mounted on the sleeve outside the twin gears to hold the latter from moving apart, substantially as set forth.

No. 382,397—Portable Crane. John A. Hath, Bayard, Ohio. Filed Oct. 27, 1887.



Claim.—1. In combination, the base C, elbow D, clamp G, vertical portion L, pipe M, and arms N, said base and clamp adapted to grasp the rail, and said arms the top of the car, substantially as set forth.

2. The herein-described support for the swinging crane, consisting, essentially, of the lower portion, D, provided with a clamp to engage the rail and with an upwardly-extending pipe section, L, and an upper portion, M, having a free vertical movement on the lower portion and provided with arms to engage the car, substantially as set forth.

3. The crane consisting, essentially, of the housing P, downwardly-projected pipe U, upwardly-projected pipe V, elbow W, having depending lugs a′, sheave e, supported in said lugs, outwardly-projected pipe-bar X, a sheave mounted thereon, a winding-shaft, Q, means for rotating the shaft, and rope Y, passed over the sheave and around the shaft, substantially as set forth.

4. In combination, the hollow crane forming a housing for the lifting-rope, a downwardly projected pipe-section, U, and an extensible support on which the pipe section U is mounted, the said support being provided with a clamp to engage the rail and with arms to engage the car, substantially as set forth.

No. 382,376—Hydraulic Cement. John Murphy, Columbus, Ohio. Filed Feb. 23, 1888.

Brief.—Improvement on Letters Patent No. 347,367, dated August 17, 1886, to John Murphy and Nathaniel W. Lord.

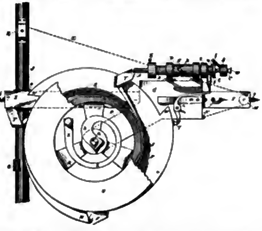
Claim.—A Portland or hydraulic cement composed of limestone, furnace-slag, and clay, which ingredients are mixed, burned, and then reduced to powder, substantially as described.

ISSUE OF MAY 15, 1888.

No. 382,802—Method of Constructing Street Curbing of Artifical Stone. Charles J. Everett, Tenafly, N. J. Filed Aug. 29, 1887.

Claim.—The improvement in the method of constructing street-curbing of artificial stone, consisting in first building the curb of stone composition and providing a guard and guide plank or plate at the edge of the curbing, and in then forming an ornamental molding and consolidating the surface at the upper and outer corner of the plastic curbing by the combined pressing and rubbing action of a pressing and rubbing tool, guiding the tool meanwhile upon the upper edge of the guard plank or plate, substantially as herein described.

No. 382,895—Rock-Drill. William O'Keefe, Elliston, Mont. Filed July 27, 1887.

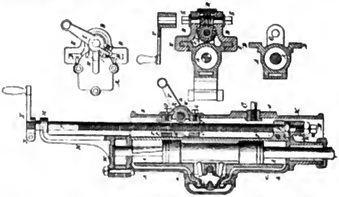


Claim.—1. The standard and guide adjustably fixed and having the traveling carriage moving upon the guide, in combination with the drill, the sleeve through which it passes, and the rotating mechanism, and the wheel or disk having the spring-handled hammers attached thereto, and the spring or elastic turning crank substantially as herein described.

3. The cylindrical drill-carrying sleeve B, loosely fitting into the stationary box or holder D, and a pin projecting from the sleeve through a zigzag or cam slot in the box or holder, in combination with a lever, Y, by which the sleeve is reciprocated within the holder, said lever having the arms *a* and *b* standing diagonally, so that one will strike the front and the other the rear of the circumferential groove in the drill-sleeve to reciprocate it and cause the pin to travel in the cam-groove, substantially as herein described.

4. The cylindrical sleeve B, having the exterior pin projecting into a zigzag slot in the box or holder D, within which it is reciprocated and rotated, and having an axial hole through its center, with a square or polygonal chamber in the rear end in combination with a drill-shank loosely fitting the hole in the sleeve, and a square or polygonal collar secured to the drill-shank and fitting the chamber, substantially as herein described.

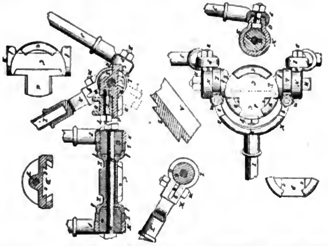
No. 383,063—Rock-Drilling Machine. Thomas J. Murphy, New York, N. Y., assignor of one-half to Roger Potter, same place. Filed July 27, 1887.



Claim.—1. In a rock-drilling machine, the combination, with the power or driving cylinder, and the guide for the same of a cylinder-adjusting screw provided with smooth-faced portions or journals or near its opposite ends, an upwardly extending guide-arm secured at its lower portion to a head of the driving-cylinder and provided with a bearing in its upper portion to receive one journal of the adjusting screw, a crank upon the screw above the guide-arm, a lug projecting from the cylinder and in which the opposite journal of the screw operates, a set screw or the like bearing against the adjusting screw, and a gear-wheel worm, and crank, substantially as described.

3. The combination, in a rock drilling machine, with a driving cylinder and a guide in which the same operates, of a cylinder-adjusting screw journaled at one end in a guide-arm carried by a cylinder, and at its opposite portion in a lug projecting from the cylinder, a collar or head secured to one end of the screw, a lug and a set screw passing through said lug and adapted to engage the collar, substantially as described.

No. 383,064—Tripod for Rock-Drilling Machines. Thomas J. Murphy, New York, N. Y., assignor of one-half to Roger Potter, same place. Filed Oct. 14, 1887.



Claim.—1. In a tripod for rock drilling machines, the combination, with a dovetail or flanged portion on the drill-stock, of a stationary jaw plate or seat provided with a dovetail segmental projection or jaw, a dovetail tongue projecting from the opposite side of the jaw-plate, a movable jaw provided with a dovetail groove to receive said tongue, a horizontal hub upon the under side of the jaw-plate, a screw-bolt passing through the movable jaw and entering said hub, and supporting-legs jointed onto the hub, substantially as described.

2. In a tripod for drilling-machines, the combination, with a jaw-seat or plate and a horizontal hub upon the under side of the same, provided with bell-shaped ends projecting beyond the jaw plate, of tapered or beveled plugs or hubs seated in said bell-shaped ends, a bolt extending longitudinally through the horizontal hub and plugs and locking the same in the bell-shaped end, a forked leg provided with loop-heads embracing said plugs, bolts or screws to tighten said loop heads, a loop-strap embracing each plug and provided with an outwardly-projecting shank, supporting legs, a bell-shaped head upon each leg adapted to fit over the shanks upon the loop strap, and a bolt passing through each shank and bell-shaped head, whereby the same are locked together, substantially as described.

TRADE-MARKS.

15,380—Plaster, Bas Reliefs Statuary, Statuettes, Moldings and Signs. Bas Relie Manufacturing Company, New York, N. Y. Application filed February 29, 1888. Used since February 1, 1888.

"The word 'Tonika.'"

15,384—Pulverized Slate. Highland Slate Manufacturing Company, Portland and Brownville, Me., and Boston, Mass. Application filed February 18, 1888. Used since February, 1888.

"The word 'Talckene.'"

STONE-CUTTING BY MACHINERY.

THE preparation by machinery of finished stone-work for a building is now quite common. It is only a few years ago when all of the work of stone-cutting was done by hand. Even the cumbersome gang saws of recent years were not in use. During the hot summer weather men could be seen in stone yards with an awning spread over them working a saw by hand. Most of the work of cutting is now a matter of handwork. But all of this will come to an end. It is not a great many years since all the woodwork of a frame house was worked out by hand. Now about all there is for the carpenter to do is to put the finished work in position. It is no longer a matter of distinguished handicraft. In time the same thing will, in a measure, be said of stone-work, though in the nature of things it is natural to presume that the work of the stone-cutter will occupy relatively a higher position than does that of the carpenter at this time. In the construction of large buildings it is quite usual to establish a stone-cutting plant in connection with the work. This was true in the building of the Indiana state capitol recently finished, as of other buildings of equal or greater importance. All the work of stone-cutting as well as stone-handling was done by steam machinery, and it was well done.

If we may judge by the Patent Office report there is quite a stimulous among inventors in the production of stone-cutting machinery. Our illustations of new inventions and the description of stone-cutting machinery which comes to hand, indicate the movement. This was dormant for a number of years and workmen as well as employes were inclined to oppose anything which would disturb the handicraft. In every town of moderate size there is a stone yard. The proprietor is generally a stone-cutter himself. He has enough pride in the old way and enough respect for his early associations to look coldly upon that which will disturb his accomplishments. In the cities, where the capital invested is larger, the tendency has been slowly in the other direction. There is less of that feeling. It is merely a question of getting the most and best work for the least money. Hence the production of stone-cutting machinery has been stimulated by this class. At first it was done in a small way, but the step once made increased competition to such an extent that progress is now rapid.

In time it is to be expected that all the work of stone-cutting, except carving, possibly, will be done by machinery and without the expenditure of much hard labor. Furthermore, it is more than probable that a very large proportion of the stone-work of the future will be done at the quarry. Why not? It saves freight on superfluous stone as well as a number of handlings. We are aware that considerable work of this kind is done at this time, but not a tithe of what may be expected in the future. It is only a short time since the carpenter bought his lumber in the rough, hauled it to the building lot and made doors, sash, frames and all from the rough lumber. It is what is being done to a very large extent in stone-cutting at the present time. The blocks of stone are hauled to the yard, sawed up in a laborious way and worked out by hand. The machinery for the production of monumental work is quite complete and shows a great many points of value to architectual stone-workers.

Not alone can machinery be used to a great extent in stone-cutting but in stone-setting as well. We may take an instance of stone-setting as conducted in this city of a hundred thousand inhabitants, on a frontage, say of thirty or forty feet. A heavy derrick is erected and the stone lifted into position by a slow, tedious process of men at the crank. There is a constant conflict between them and the bricklayers. One or the other of them is always behind. It takes from two to three months to set up a front of three stories of stonework. With properly arranged machinery the entire work could be done in two weeks, and with no more help. It might be that the work would not be done in fourteen consecutive days but that would be all the time actually employed in putting in position all that much stone. The other portion of the time would be taken up by the other masons. Stone-setters, builders and the people alike have come to think of building work of this kind as being essentially slow, and they have done nothing, excepting in rare instances, to make it otherwise. The first thing to do is to substitute steam machinery for man power and the derrick. The next is the proper construction of travelers for handling the stone laterally. This can be done on the ground at the derrick itself in small structures and by the construction of elevated runways in larger work. This is the way it is done in heavy buildings such as the Pittsburgh court house, Indiana state house and others.

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GRINDSTONES.

A correspondent of an Eastern paper gives a description of a visit to the Bay of Fundy and along the shores, where the grindstone quarries are located. The superintendent of the quarry says when the tide is out his men go down on the rocky shore and work out near the water. At low tide the men on the shore drill some holes in the ledge, put in powder and blast out great pieces of rock. When the tide rises again they float out some big logs and empty barrels over where the loosened rocks are. When the water goes down again they fasten a big rock to the raft with heavy chains, so when the tide again rises it lifts up the raft and the rock with it. Then they tow it as near the shore as they can. If it is the right kind and size for a millstone, sometimes it is allowed to lie there until the workmen, with stone chisel and hammer work it into the proper shape. At other times, by means of a derrick, it is drawn out on the wharf. Then it is rolled on a track and hauled to the factory.

At the great stone factory the large piece of rock is placed on a carriage with a saw similar to the up and down saw in a mill, the rock is sawed into great slabs of the right thickness for the grindstone. The saw does not have teeth, but wears its way through the rock with the aid of sand and water, which are continually pouring on. Then the slabs are taken, a hole made in the center, the edges trimmed off with a chisel, and the whole placed on a kind of lathe, turning it until it is true and the edges smooth. The rock from which the grindstones are made is a kind of sandstone, and there is a great difference in the "grit," some being course and some fine. Often several different degrees of "grit" are found in the same quarry. There are many quarries along the shores of the Bay of Fundy. The reason stone is taken from under water, when there are many quarries a little distance from the shore, is because the best stone comes from the bottom of the bay, where it is covered at high tide.

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"STONE" is the title of a new technical journal started in the interest of workers and users of stone, marble and granite. The first number, which is before us, is interesting, and bears the promise of being useful as a medium of communication between the members of these trades. It contains thirty-two pages, together with a plate illustration of the accepted Indiana monument; is published by the D. H. Ranck Publishing Co., Indianapolis.—*Building.*

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F. Heide & Co., Huntsville, Ala., will develop a stone quarry near that city.

OUR ILLUSTRATION.

We present this month another design for the Indiana State Soldiers' and Sailors' Monument. It is the work of Mr. A. A. McKain and Mr. L. H. Gibson of this city, and Mr. L. Taft, of Chicago. The general weakness of American architects in matters of monumental design has been lamentably illustrated in the recent competition. Of the whole number of designs presented the experts had it in mind that it was only possible to have selected two that could have been used, that of Mr. Schmitz, which was regarded as very promising, and that of Mr. Stone, of London, which was quite commonplace, yet fairly satisfactory in the matter of design. The particular weakness of the design which we here give is in its lack of the proper accessories. It is dropped down into the center of the Circle Park without proper consideration for the location. The great octagon base stands up some forty feet from the ground. There is nothing but the steps which surround it; the figures which occupy their various positions could hardly be made to prove satisfactory at this hight. This design could have been made much more effective if the high base could have been entirely omitted and the eight figures deposited upon slightly elevated bases upon a stone plaza which would occupy most of the space of the circle. A slightly raised wall on the outer edge of the plaza or walk would have added to the effect, particularly if it were elevated sufficiently to make a few steps of approach necessary. These approaches could have been decorated in a dignified way and the entire scheme improved. The general style of this design is the Romanesque and the details are mostly drawn from works in Southern France and Spain.

DESCRIPTION.

It has been the object of the authors of this design to combine the various ideas which might be used in detail for a single monument—for instance, a memorial tower alone could be used, or the sculptured groups upon the required number of bases, or a memorial hall in which could be placed various war relics and sculptured representations of the story of the war or other features which have to do with the defense of the state.

In the design submitted it will be seen that there is first an octagonal structure, from which is projected an octagonal tower.

In the first structure named there is space for war relics and various memorial articles, including battle flags now in the possession of the State Librarian. There is abundant space for cabinets to be arranged to contain articles of this kind which might come in the possession of the state. This would include relics from the various battle fields. We have sought to afford space to make a feature of this part of war history, in presenting a design with abundant wall space and windows located well above the floor.

The octagonal tower is two hundred (200) feet in hight, with elevator and stairway in the center for means of connection with the lantern at the top. The location in the center of the Circle gives opportunity for views of such a structure from any distance in four different directions, the State House being the only interruption, located as it is about one thousand feet on the west.

Space for sculptured groups are indicated upon the eight corners of the memorial building, and upon the eight sides of the tower above this building are panels for bas relief work, all of which are to be used as subsequently indicated in description of sculptural portions.

SCULPTURE.

In the sculptural portion of this design it has been our aim to provide something more than a mere decorative feature; we have endeavored to give a deeper significance to these groups and reliefs, and while subordinating them to the monument as a whole, to make each one contribute its part toward telling the story of the defense of the state.

For this reason we have discarded as far as possible the usual conventional representatives of the various divisions of the service, and have preferred to recognize these departments by means of spirited groups in action. These groups will illustrate, as far as practicable, historic incidents of the war. While treated with all the vigor and realism of modern French sculpture, they must, above all, embody the sentiment and voice the peculiar patriotism of our own nation.

These groups are to consist of heroic figures—eight or nine feet in hight. Each group is ten feet in diameter and from ten to fourteen feet in extreme hight. The use of bronze in all this work will insure not only the indestructibility, but likewise the exact representation of the artist's every touch in the plastic mold. The subjects of the eight groups proposed are briefly as follows:

EARLY HISTORY.

1. Tippecanoe—Gen. Harrison on horse-back attacked by Indians, and protected by soldiers, who endeavor to lead his horse to a place of safety.

2. Mexico—Soldiers charging upon a fortification.

II—CIVIL WAR.

3. Infantry Group—"The Defense of the Flag." A group of five figures surrounding a flag which is proudly waved by the bearer. The determination shown upon the faces, even of the wounded, proves that for them there is "no surrender."

4. Cavalry Group—Three gigantic horses in full gallop. Two cavalry officers spurring them on; one horse riderless, yet holding his place in the charge. The possibilities for active artistic effect in this composition appeal to all.

5. Artillery Group—A field piece just fired is surrounded by the cannoniers, who before reloading pause a moment to note the effect of the shot.

6. Navy Group—A number of sailors and gunners upon a river gunboat are represented as catching sight of a flag of truce shown by an opponent. Their half-clothed figures form a picturesque group as they climb upon the cannon and wave their caps at sight of the welcome signal.

III—RESULTS OF THE WAR.

7. Emancipation—"Ye are bought with a price." President Lincoln with proclamation directs a soldier, who removes the shackles from an aged negro. Upon the other side, a soldier with bared head leans over a stretcher upon which lies the body of a comrade. The dead man's wife kneels beside his remains, and buries her face in the flag which covers him. Another negro, a young girl, is seated at the end of the bier and regards her sympathetically.

8. Reminiscences—"The old cannon." An old man seated on a stone by a wheel, marking with a cane in the dust a rude map to illustrate his story which he is telling to a young man at his side. There are children playing on the other side of the group and a dog asleep under the cannon.

In the extended series of bronze relief for which we have already prepared designs, but which could not be represented in the accompanying plates, it is our purpose, likewise, to tell a connected story. In this we have been highly favored by the circumstance that upon the very spot devoted to this monument was pronounced a few years ago one of the most eloquent of all known orations. This famous address by Robert G. Ingersoll, which is a veritable epic of war, it is our purpose to worthily illustrate by an epic in bronze.

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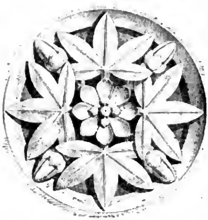
"DYNAMITE" HOCKER WANTED.

When the grand jury sits next week they will be called upon to find a bill of indictment against Jacob H. Hocker, familiarly known as "Dynamite" Hocker, who made a specialty for years of blowing out stumps, rocks and stones from quarries. The great and only "dynamiter" is not in the country at present. Detective Rue, of the Pennsylvania railroad company, residing at Philadelphia, wants Hocker for obtaining goods under false pretense. The charges are that Hocker, on or about the 7th day of August, 1886, did unlawfully, falsely and fraudulently receive and obtain of and from the Pennsylvania railroad company a lot of powder, of the value of $350. The powder belonged to Solomon Zimmerman. Hocker represented to the company's officials that he was Zimmerman's agent, and used other devices to secure the goods. It seems he gave a fictitious name to the agent, and the latter never having seen him before or since, it required some time to fix the identity upon the right man. Hocker became aware of the investigation then being made, and, after waiting for positive developments, he fled the country. Detective Rue has since made information before Alderman Fager who placed the case in the District Attorney's hands. The purpose is to obtain a true bill when papers will be issued that will bring the "dynamiter" to bay. *Harrisburg Independent.*

ANALYSIS OF FORM.



PREVIOUS to studying the great variety which exists in the combination of all kinds of ornamentation, it becomes necessary to examine the nature of form when reduced by analysis to its first and most simple principles. The value of the analytical process in chemistry and other sciences, for the purpose of discovering the elements of organic and other substances, and from which to trace their gradual development, has been long acknowledged and successfully acted upon. If, therefore, we can apply the same process to ornamental form, and truly "begin at the beginning," we shall certainly obtain a mastery and power over all subsequent combinations, which could not be so easily gained by any other method. The arts, as well as the sciences, should be approached by first becoming well acquainted with their elementary constituents, and by eliciting their several powers, gradually to follow their compound formations and numerous ramifications. For, undoubtedly, from the most simple geometrical figures, issue the means of producing every species of agreeable form and combination of pleasing lines. It is particularly necessary to observe how the same forms and lines have been used at various and distant periods in the progress of art, even from the time of the Egyptians and Assyrians, so that by contrasting the different modes of treatment of the same elementary forms, we may see what variety has been evolved, or how often the result has led to similarity.

The principles of geometrical ornamention are the same in all styles, and the most elementary combinations are to be found, more or less, at every period. Although there is a wide and marked difference between the styles in the architecture of different ages, still it is curious how the forms used have led to similar ornamentation, varying only in its peculiar conventionality. This may be seen by comparing some of the Chinese, Japanese and Indian lines of ornamentation with Romanesque and Gothic forms. In the Japanese, especially, the conventional forms, rendered from nature, approach very closely to some of the very best of our mediæval work. The fact is that the geometrical elements, and the fundamental principles upon which all art is based, are to be found throughout nature in every part of the globe, and earnest students of nature, of whatever period or position, will, to a certain extent, independently of each other, arrive at similar results.

Instead of wasting time in disputing what particular style of architecture is best or most suited to the present age, and fiercely waging what was called the "battle of the styles," if a search were made dispassionately into what constituted "the beautiful" in all of them, we might elicit material for a new and independent style. In the Egyptian, for instance, all the ornaments are of the most simple and elementary kind, a repetition, perhaps, of a mere circle or square, or of a lily-formed figure; yet the effect is always agreeable, and from its simplicity the eye is not fatigued. Look at a mummy case; every part may be literally covered with ornamentation, yet all is simple, quiet, and in perfect good keeping. How different, in comparison with the forms in the latter "Renaissance" styles, where the lines are of such an extraordinary and complicated character that the eye is distressed at a mere glance at them, and, unless they are attacked and worked out after the manner of a puzzle, the examination is given up in despair. This is too often the effect of modern work. Works embracing enormous labor strike us only with the greatest indifference.

We are told that, mathematically, lines have "neither breadth nor thickness." Still, every one knows practically, what is called a line, and that we have thick ones and thin ones, straight and curved lines; and all forms are bounded by lines. Further, we see what we call "beauty of line," or "bad lines," even in a piece of sculpture, where there are no lines whatever, except the form or contour of the object itself. All curved and straight lines, of whatever kind, are based upon the simple geometrical forms of the triangle, the square, the pentagon, and the circle, with their compounds, the hexagon, octagon, decagon, ellipse, parabola and hyperbola, as also some few others, which are very seldom used. Indeed, several of these are used but occasionally. The principal forms used in combination are the three simple elementary figures, the triangle, square and circle; with their compounds, the hexagon, octagon and ellipse.

All compound curved figures are more or less based upon the circle. The circle, when combined with the triangle as a solid, forms a cone, from which is obtained the elliptic, parabolic and hyperbolic curves; as well as the spiral, which is produced by an oblique continuous line wound round the cone. They are, therefore, in some degree evolved from the circle. Much has been said about the subtlety and beauty of compound curves, and of the circular being the least beautiful, but why it is so, is not so clear. The more subtle compounds, although beautiful when properly applied, are of very exceptional use, and become positively absurd when improperly applied. That form is the most beautiful which is the best adapted for the purpose intended, and all beauty must be relative and depending upon the harmonious use made of certain elementary compound forms. Now, as the circle is used very much oftener than either of its compounds, and the only form which probably is applicable, it must be the most beautiful in all such cases. This occurring so continually must necessarily raise it very high in the scale of beauty.

Geometrical lines and forms are applied in decoration mainly for three distinct purposes. First, they serve to divide surfaces into separate parts by combination and repetition of forms, upon which to apply foliated or other ornamentation—technically called diaper-work. Second, by repetition of form in one continuous direction only, and applied to borders, margins, mouldings, string-courses, and the like. Third, by radiation from a center, or on each side of a center line, as applied to centers of panels, flowers, bosses, and other similar purposes. *J. K. Colling.*

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MILES STANDISH'S MONUMENT.

Work on the Standish monument on Captain's Hill, Duxbury, Mass., is progressing favorably. The monument will be, when finished, 100 feet high from the grade to the top of the parapet or base of the statue. The diameter of the base is 28 feet, and at the top 16 feet. The base is octagonal to the hight of 25 feet, or to the hight of the projection of the lower cornice; above this the monument will be perfectly round. The foundation runs 8 feet below the surface of the ground, and is laid solid in hydraulic cement. The granite for the shaft will be irregular blocks, and no course willl be less than 8 inches nor over 12 inches rise outside.

The fact that the great Puritan captain has waited over 200 years for this recognition calls attention again to the unseemly haste with which New York is rushing the Grant monument. Miles Standish was a little late himself. John Alden got ahead of him.—*Boston Traveller.*

THE OOLITIC LIMESTONE OF INDIANA.

MUCH has been written of late, in a generalizing way, about the Oolitic limestone of Indiana but the fact that practical builders, engaged in works of magnificent proportions, have chosen it for their purposes from New Orleans to the lakes, and from New York City to the Mississippi, and far beyond, speaks in a language better understood than that of the scientists, its just praise. State geologists of Indiana have, from the discovery of this surpassingly fine stone down to the present day, allowed no opportunity to go by without a word in its favor. In each report since the date when it was first examined by this department, my able and energetic predecessors have had their say, and yet not enough is known regarding what has the just right to be named the best building stone in the world. Not only the best in point of durability, but best in every sense of the word, this stone may challenge all manner of tests. It is flexible, elastic, resonant, uniform in its grain, equally strong in every direction, perfectly homogeneous in fact. These qualities give it the best possible power of resistance to strain or crushing force. A bar of this stone may be bent very perceptibly, and when the force is removed it will spring back to its normal state with the promptness and energy of steel. Its tone when struck is a clear, musical bell-note, indicative of thorough metalic sympathy throughout the mass. This quality of perfect resonance, taken in connection with the fact that the stone cleaves nowhere save directly in a line with the cleaving force, gives the best evidence of an evenness of grain and a smoothly distributed cohesiveness of particles throughout the mass. When first quarried it cuts like sandstone, yielding readily to tools of all kinds. It is then soft, and yet tough enough to hold well the finest figures of carving. It comes from the quarry cut by a steam channeler into blocks or quadrangular columns six by ten feet, and a hundred feet long if desired. Its color at first is a pale brownish, which gradually lightens to a soft cream or grayish white.

Chemically speaking, the oolitic limestone is, practically, a pure carbonate of lime, the amount of matter other than this carbonate being less than 4 per cent. In other words the carbonate of lime constitutes nearly 97 per cent. of the stone. This purity insures absolute integrity on exposure to the fumes of coal, while the perfect elasticity and flexibility of the mass render it invulnerable to the forces of cold and heat, air and moisture. Cliffs of this limestone exposed to our variable climate for unknown centuries show no sign of disintegration, the finest angles standing out as sharp now as when first the mass was fractured.

Physically the oolitic limestone is in fact a calcareous sandstone composed in chief of small grains of lime carbonate. It occurs in massive bodies, often forty feet thick, without any lines of cleavage or parting, perfectly bedded, homogeneous throughout, a solid single stone, in fact from which a flawless block of any size possibly manageable may be cut. It takes up a very small amount of moisture, which is so distributed that no degree of cold will work injury. When we consider to what awful and prolonged frigidity of temperature this rock was exposed during the glacial age without in the least affecting its integrity, we may safely trust it in our buildings. Other limestones were cracked, shivered, crushed under the compressions and expansions of the Arctic period, while this massive deposit was scarcely changed in any part of its great body.

The area of the oolitic limestone deposits of Indiana lies principally within the following counties: Crawford, Harrison, Lawrence, Monroe, Owen and Washington. Geologically it belongs to the St. Louis group of the sub-carboniferous rocks, and owes its existence in a large degree, I think, to the destruction of older rocks by the action of water and a chemical and physical rearrangement of both soluble and finely-divided insoluble matter resulting from such destruction. We find in the Keokuk limestones, immediately below those of the St. Louis group, geologically, a vast amount of crushed and ground up shells. Indeed, many of the rocks are almost wholly formed of pulverized remains of various marine forms, such as brachiopods, radiates, crustaceans, etc., all pressed together in a mass, often quite loosely cemented. In places this formation has been reduced to a marly clay, in others to a loose, rotten silicious shale, owing to the vicissitudes attendant upon the great changes constantly taking place in the depth and currents of the sea during and after their deposition. So the rocks of the St. Louis group are not infrequently vast beds of fossiliferous clays and shale, showing decomposition and re-arrangement, to a great extent, owing to causes arising subsequent to their original formation.

The area of the oolitic limestone is peculiarly limited, showing in many ways that the rock has been deposited at the bottom of a deep sea by precipitation (chemically) and sedimentation, generally of calcareous matter, in a free state partly, and partly in combination. The insoluble fragmentary matter represents calcareous fossils, whose shells are very minute or are in a fine state of mechanical division, and these particles have been evenly cemented throughout the body of the stone by infinitessimal concretions of almost pure carbonate of lime. While its process of formation has been analogous to that of chalk, it has nothing of the porousness characteristic of the cretaceous foraminiferous deposits, and under the microscope it shows a compact structure, closely resembling the finest and closest-grained sandstone, saving that the particles are largely fragmentary, angular, and clearly show their derivation from shells. If we look about us for a present instance of the precipitation of calcium carbonate from water, we shall find it in some of the small lakes in the northern part of our state, where a soft white "chalk" is constantly being deposited. This lime precipitate is equivalent to the cementing matter of our oolitic limestone, and both materials are due to the same chemical action. In the cretaceous chalk, formed so largely of foraminifera, the mass is loosely deposited and feebly cemented, as a rule, but the oolitic limestone, though coming comparatively soft from the quarry, has a peculiar toughness and density, and withal a dryness, which renders it a puzzle at first to every examiner. These features are due to the semi-concretionary nature of the structure, resulting from the co-operation of affinity and gravitation in the arrangement of the matter. The stone is granulated, rather than crystalline, in every particular, and yet, under the microscope, the grains show a nicety of correspondence—a perfect fitting, so to call it, which is the secret of resonance, elasticity, flexibility and non-cleavage. The following analysis is a fair average for the true oolitic limestone:

Specific gravity	2.72.
Lime	53.55 per cent.
Carbonic acid	43.33 per cent.
Water	.56 per cent.

With a trace of magnesia, iron, alumina, manganese, phosphoric acid, silica, and possibly another mineral not distinguishable, all in practically equal parts, amounting together to 2.56 per cent. of the whole. The iron oxide is barely perceptible, amounting to less than one-tenth of 1 per cent., and in many specimens it can not be discovered at all by the ordinary tests. It must be stated here that the above analysis was of stone quite recently quarried.

The St. Louis group of rocks has been a puzzle to geologists on account of its many eccentricities of deposit, and nowhere are these eccentricities more exaggerated than in Indiana. The tendency of the strata to dissolve and reform is very marked. Clastic masses of argillaceous fragments cemented by carbonate of lime are found throughout the area, and in fact a large part of the formation (especially the lower strata) is evidently the result of the destruction and re-arrangement of fossiliferous rocks of the same or an older group. The massive oolitic limestone rarely contains well-preserved fossils, while around its periphery (where it gives place to shale, marly strata and cherty deposits), rich beds of finely preserved organic remains exist. Indeed, everything connected with this fine building-stone formation appears to be evidence of the fact that the oolitic limestone has been laid down in a deep trough at the bottom of a sea, and that this has been surrounded by shallower, and therefore, more boisterous waters. The agitation of the shoal part of the sea caused the water to take up in solution the soluble substance of calcareous shells and limestone, and to hold in suspension a great amount of insoluble matter in a fine state of pulverization, a large part of which was precipitated as soon as it was carried by the sea-currents out to the calmer deep-water area. Thus slowly the massive, homogeneous limestone gradually formed in the deep trough or hollow surrounded by shales, chert and marly deposits, as the slitting and chemical precipitation went on together. When, with the filling of the trough and other causes, the sea grew shallower, strata of impure rock were formed above the oolitic deposit similar to those already laid down around it.

The oolitic is the surface rock over a considerable part of its area, owing, no doubt, to the fact that the overlying strata being argillaceous and iron-bearing have been easily removed by water or reduced to clay in place.

In Washington county the oolitic limestone is found underlying a varying deposit of blue, coarse refractory, iron-bearing limestone, which in many places has disintegrated and formed a red clay, in which characteristic St. Louis fossils are preserved. Along the periphery of the oolitic deposit the stone becomes coarser in its texture and is often a mass of minute, well-preserved shells and fragments of shells rather loosely cemented.—*Indiana Geological Reports* 1885–86.

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Writing of STONE, the *American Architect and Building News* says: "Amongst the many new trade journals which publishers all over the country are sending out in never-ending succession, is one which really seems to touch on a comparatively uncultivated field. Brick and wood and iron have long had trade papers devoted to the development of their respective interests, but we cannot recall that any one has, until now, turned his attention to the attempt to wring fortunes from stone through the agency of printer's ink. Handled seriously, the chance of making a useful and successful journal seems to lie within the reach of the publishers of this one, and one from which architects especially may derive much benefit.

The vast deposits of the most varied kinds of building stones in this country are little known, some not even suspected, others just discovered, and only a few really worked in such a way that the product of the quarry can be really considered "in the market" for the use of any one who prefers, for one reason or another, to use that particular stone. Until within a few years builders used certain stones mainly because they were "handy" to the site, but the increased facilities for transportation now makes it possible for an architect to exercise a limited choice in the selection of his building stone, and we believe that such a journal as this will do a great deal toward very rapidly expanding the field from which selection can be made. There is generally capital enough watching for a chance for investment, and if the editor can point out promising deposits of new varieties there will shortly be many more building stones in the market than there are now."

THE PRESERVATION OF BUILDING STONE.

A recent issue of *La Semaine des Constructeurs* reviews the report of Professor Tetmajer, of Zurich, who has been engaged in experimental investigation of this subject since 1884. The following abstract gives the most interesting results.

The principal injury to many building stones, especially argillaceous-calcareous stone and sedimentary sandstone is the scaling and disintegration caused by water absorbed in the pores and freezing there. This cannot be practically and satisfactorily remedied by covering the stones, nor by varnishing the surfaces, so that it has been attempted to fill the pores with some substance that will exclude moisture and strengthen the material of the stone. Among the agents proposed, the "fluosilicates," invented by MM. Faure and Kessler, have given decisive results. The fluosilicates or *fluates* are introduced into the stone in a liquid state, and decomposing the carbonate of lime, the silicic acid formed is precipitated in a gelatinous state, liberating insoluble oxides which, with the silicic acid, fill the pores, while the fluorides increase the resistance and durability of the stone.

M. Tetmajer's experiments were with a fluosilicate of alumina and magnesia, $Al._2\ Si._3\ Fl._{18}\ Mg.\ Si.\ Fl._6. + 6H_2\ O$, and a fluosilicate of magnesia and zinc, $Mg.\ Si.\ Fl._6.\ Zn\ Fl\ Sv_6. + 12\ H_2\ O$.

The first is sold in liquid form, and the second in crystals soluble in water. They are colorless and do not affect the color of the stone. The principal experiments were made on two varieties of soft sandstone from Ostermundigen quarries near Berne; one blue containing 18.8 per cent. of carbonate of lime, and the other yellow, containing 19.9 per cent. Fifty-two similar specimens of each kind were used.

The following results were obtained from tensile tests:

Condition of Specimen		Resistance in kilograms per square cent metre.		Number of tests whose mean is here given
		Bluestone.	Yellowstone	
Natural	Anhydrous	14.6	16.0	5 to 8
	Dried at 110°	9.0	7.0	
	Saturated with water	3.4	3.6	
Impregnated with magnesia		23.9	22.6	5
Impregnated with alumina		17.2	14.9	
Natural, frozen		11.1	13.1	10
Impregnated with magnesia, frozen		25.1	23.7	5
Impregnated with alumina, frozen		14.4	2.5	

The anhydrous specimens were subjected to no treatment or preparation.

The saturated specimens had been immersed in water 38 days, after which those so marked were dried at a temperature of 110°.

The impregnated specimens were immersed for ten hours in the fluosilicate solution and then dried for ten days until they have attained a constant weight.

Untreated or natural specimens were saturated with water and then subjected to 30 successive congealations at a temperature of 10° C., and specimens that had been impregnated with the fluosilicate were similarly treated.

M. Tetmajer concludes that this method of impregnation by magnesia is an excellent preservative for calcareous oolitic stones and for porous calcareous sandstone, but that impregnation with alumina is injurious on account of the amount of carbonic acid produced.

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Congress has passed a bill appropriating $22,000 for a suitable stairway to the Battle of Bennington monument.

DURABILITY OF STONE.

As our country increases in wealth, stone is used more extensively as a building material. In the Eastern cities stone buildings are becoming more common every year, and there is everywhere an increased use of stone for decorative purposes. Yet with all this increased use of stone, there are very few who give a thought to the fact that stone is not at all times a permanent material. The careless observer thinks of it as the most permanent that can be used regardless of the variety of stone or the climate in which it is used. The oldest buildings on the continent are of stone, buildings which have stood for centuries. In this country the atmospheric conditions are widely different and the length of time which stone will last is decided by the climate as well as by the variety of stone used. Though stone has been used for building since the earliest times there has never been any systematic attempt to investigate the character of the stone which will best stand atmospheric conditions, or to discover what will prevent climatic action.

With almost every important public building here and in England there have been made unsystematic and partial attempts to investigate the best stone to be used, and some methods of preservation have been considered, but the work, to be done thoroughly, must be by the concerted action of a large number of people and not by an occasional committee appointed by a building commission. While such work is valuable as far as it goes, it is not possible for it to be exhaustive enough to be of great benefit.

There are now being erected public buildings which possess architectural merits, and in which is invested sufficient money to make it desirable that they should stand for centuries, but who considers such a thing possible? Yet many buildings on the continent are in good condition which have been standing hundreds of years. Perhaps even in our climate, were the right stone selected, and the proper methods adopted for its preservation, our buildings might last, if not for a thousand years, at least a few hundred. It is for this that we suggest concerted act.on in this matter.

A rough estimate of the "life" of various stones is given below. The stones around New York City and vicinity were selected for investigation because there is a more universal use of stone there, and the climatic conditions are applicable to almost the entire country. By the term "life" is meant the period after the decay becomes sufficiently offensive to the eye to demand repair or renewal, without regard to discoloration or other objectionable qualities.

	Life in years
Coarse brownstone	5–15
Laminated fine brownstone	20–50
Compact fine brownstone	100–200
Bluestone	Untried, probably centuries.
Nova Scotia stone	Untried, perhaps 50-200
Ohio sandstone (best siliceous variety)	Perhaps from 1 to many centuries.
Limestone, coarse fossiliferous	20–40
Limestone, fine oolitic (French)	30–40
Limestone, fine oolitic (American)	Untried here.
Marble (domolite) coarse	40
Marble (dolomite) fine	60-80
Marble, fine	50-200
Granite	75–200
Gneiss	50 years to many centuries.

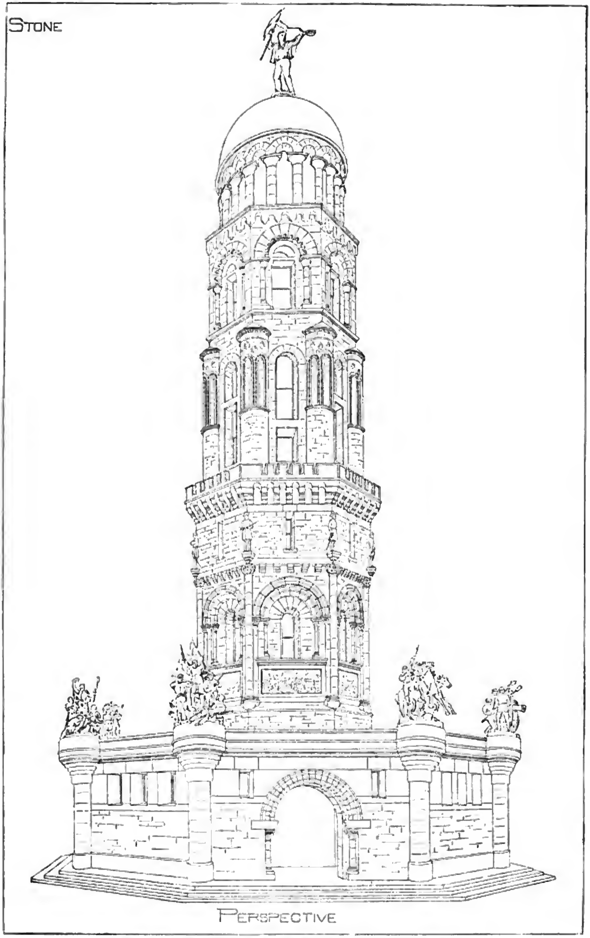
The hasty statements of despairing architects, in denunciation of the brownstone are sufficiently answered by reference to the texture of the still softer oolite, which mediaeval architects were content to employ, and whose fragility seems to have been at last counteracted by modern devices. When proper investigations shall have been made, it is possible that the porosity of the stone, which now renders it particularly sensitive to atmospheric attack, may best avail for the absorption of some cheap and durable mineral preservative, and that the present use of such stone in its raw, crude and unseasoned state will be hereafter considered merely an evidence of the unintelligent and wasteful way in which we now work.

When a building is being erected, how often do we hear of the owner or architect giving intelligent consideration to the matter of the best stone to be used as regards its durability. All varieties of soft, porous stone are used and in many of them the effects of the weather is noticeable in five years, while an immunity from decay for twenty or thirty years is considered remarkable. In New York City alone the amount of money expended yearly to repair stone which is falling to decay is sufficient to erect many handsome new buildings.

That the climate of our country is particularly trying for stone is unquestioned. The amount of smoke in the atmosphere of our cities, the dampness, together with the rapid changes in temperature make the study of building stone for this country a problem difficult of solution, but the very difficulty of the problem is the best reason for its careful study. Aside from the effects of climate and the porosity of much of the stone used, part of the disintegration is due to the careless way in which it is used. We could point to many important buildings where much of the stone has been set on edge, and in some cases begun to peel before the buildings were completed. That this should never happen is evident. It should be to the interest of both architect and quarryman that stone should be properly used, and thorough investigation which would call attention to all these details and awaken public sentiment would make it necessary that some one should see that the stone is properly used in every important building.

There are three external agencies which accomplish the destruction of stone, chemical, mechanical and organic. The chemical agencies consist principally of acids, which attack and dissolve every constituent of stone except quartz. In large cities the gases which come from the consumption of illuminating gas, coal, and the decomposition of organic matter, together with those which come from chemical works, dye houses and various other manufactories, are sufficient to materially affect building stones. There were found in the rains of Manchester, England, by Dr. Angus Smith, from 1.4 to 5.6 per gallons of sulphurous and sulphuric acids, due to these causes. The carbonic acid which comes as the result of respiration, as well as the causes named, was found to exist in the air of Manchester to the extent of 0.03 to 0.08 per cent., while in the country there was only found 0.03 per cent. These and various other acids are found in the air of every city, and are probably the most constant and effective agencies in the destruction of building stones. The organic matter contained in the street dust which is constantly blown against buildings has much to do with their destruction. That this is not a mechanical agency solely is shown by investigating stone which is not exposed to rain where the dust lays continually. Under the coating of of stone stone is found to be much decayed, and peels off readily from friction.

Of the mechanical agencies which affect stone, frost is undoubtedly one of the most severe. It has been estimated that where freezing is produced suddenly in a closed vessel the effect is equal to the blow of a hammer of twelve tons weight upon each square inch of surface. When one considers how often in our variable climate this effect is produced in porous stone there will be found abundant reason for not using such stone for permanent buildings. Again, any change in temperature tends to produce warping of stone. Bunker Hill monument is constantly moving from the warping of stone of its various sides. In our climate a change of 70 degrees a day is not unusual in some localities and this



DESIGN FOR INDIANA STATE SOLDIERS' AND SAILORS' MONUMENT
By A. A. McKain, L. H. Gibson and L. Taft.

change together with sudden showers rain falling upon the heated surface tend to materially break the rock.

The action of wind is a factor in the decay of stone. A gentle wind which dries out the moisture does not injure stone but probably tends to its preservation, but a violent wind which dashes particles of sand, street dust and ice particles against its face will wear it away. This action is well known on the plains of Arizona and Colorado, where the sandstone is worn into pillars, and strangely shaped hills by the action of the sand particles which are blown against them. In church spires and in towers the action of the wind presents a different feature in that the edifice is swayed to and fro, so that a constant motion is produced at the joints and as well among the stone particles themselves. It is wise to consider that when a building fronts to the east, northeast or north, that a stone of the greatest durability should be selected on account of the action of the storms coming from those directions.

The effect of rain itself when not accompanied by wind is dependent upon the amount of chemicals found in the atmosphere. In countries where the air is pure and free from acids, heavy rain storms do not seem to materially affect stone. But where the air is foul, the chemicals are held in solution by the rain and penetrates into the interior of the stone in a way to make the effects very disastrous.

The organic agencies which may affect building stone plays little part in this country. There seems, however, to be one variety of lichen, that of the *conferbæ*, which does injure the stone upon which it grows. It is to be found during all seasons of the year, under heavy cornices and in places where the sun does not reach, and causes the stone to decay. For this reason the growth of heavy vines is not recommended, as this lichen will grow under them to the detriment of the building.

There are boring mollusks which in England so perforate the stone in breakwaters and piers as to soon render them unfit for use, but they have been little observed in this country. A cargo of Italian marble, sunk in New York harbor in 1871, was found thoroughly perforated by these mollusks and would serve as an indication that this thing is to be watched in the piers and bridge foundations of that region.

The composition of the stone itself has much to do with its durability. A stone which contains an element which is easily dissolved by the atmospheric acids is not a wise choice for a permanent structure. There are many elements which are thus affected which we have not space to mention. The biotite in some granites renders the stone weak through its decomposition. There are some varieties of brownstone which contain minute scales of a kind of biotite which is readily affected by the weather. These brownstones decay rapidly. Orthoclase is apt to render a stone weak as it is easily decayed. When found in either granite or sandstone it would be well to examine it to ascertain its present condition and test it in regard to its resistance to acids.

The seasoning of stone is well known to affect its lasting qualities, although the exact nature of the process of seasoning and the composition of the "quarry sap" thus removed have never been investigated. It is commonly recognized, however, that stone, thus seasoned before being inserted into masonry will better withstand the weather.

Of the physical structure of stone we have not space to speak at length. It is well known that a rock which is porous is not as durable as one in which the pores or interspaces are minute. The reason for this is obvious. The hardness of a rock is commonly supposed to increase its durability though some soft rocks have been found to resist atmospheric influences very well. The hard, tough rock is adapted to resist friction and is suitable for pavements, but soft rocks such as some steatites and schists make very good buildings.

The method by which stone is placed in position has much to do with its decay. Much stone is placed, as said before, on edge and the atmosphere can thus affect it directly through its laminæ. Where stone is placed with the laminæ horizontal it is found to be much better preserved than where otherwise. The pointing and kind of mortar used has an important bearing in this matter. It is not infrequent that we see new masonry so imperfectly constructed that a trowel can be inserted a considerable distance. Where poor mortar is used it soon drops out and leaves the stone exposed. The effect of rain and snow getting into such places is evident. It is rare indeed that any systematic attempt is made to have the masonry perfect, or to set the stone properly, while it is probable that these two causes of decay are the only remediable ones always at hand within our present knowledge.

NEW MACHINE FOR CUTTING MARBLE.

H. O. Nelsen, proprietor of Nelsen's Foundry and Machine Shops, at Knoxville, Tenn., is the inventor of a new marble saw machine.

The new machine is so constructed that two sets of saws are geared together and are attached to a common eccentric at right angles. This takes up all lost motion. It also renders the building of a costly stone foundation useless, as the machinery can be placed on an ordinary dirt floor. The "saw gates" are so arranged that they remain stationary, the stone being moved up by a simple device and pressed against the saws. This is exactly opposite motion to all other machines in existence. Another difference and very great advantage is that the saws are one continuous band and are much thinner than the old style. They are fastened around pins in the gate, being carried back and forth from one end of the saw gate to the other end and wound around the pin at each end, hence it is one continuous piece of hoop iron and cannot pull out. In the old machines each saw is a separate one and is riveted at each end. These rivets frequently pull out and then the saw must be replaced. This fact also requires a much thicker saw for the old machine. The most wonderful improvement is the rapidity with which the new machine cuts the stone. The best machine heretofore in use would at the best possible speed only cut a thread of six inches in twelve hours. The new machine will cut an inch an hour, twelve inches for the twelve hours, and it will do better than this when the machine has been used a little to wear off friction. All this work is done with just one half of the power required for a given stone under the old saws. Thus a five-horse power engine will do, with the new machine, what is done by a ten-horse power with the old saws and in one half the time. The best machinery which hitherto has been used could only be run one hundred strokes per minute, the most of the machinery only about sixty-five or seventy strokes a minute. This machine makes two hundred and forty strokes per minute without any strain on the machinery.

DROPPED A KEG OF POWDER.

A terrific explosion occurred at the powder-house at the Prattsville brownstone quarry, near Stockton, N. J., May 17. One man was killed, several others were injured, and a number of houses were wrecked, and considerable property was destroyed. The report was heard twenty miles away. Three hundred kegs of powder exploded. The explosion was caused by a man dropping a keg of powder.

The shock of an explosion of powder at Stockton was distinctly felt at New Brunswick, N. J., thirty-six miles distant, houses there and other places were shaken.

LIEN LAW.

LIEN law is intended to benefit those who supply material and labor for building purposes. We are inclined to think that it fails of its object. Its operations are slightly different in the different states. In general terms, it is intended to offer those who supply material and labor recourse upon the owner of the property in event of their not being paid by the general contractor. It is particularly for the benefit, as presumed, of those who furnish labor, and the sub-contractor. The general contractor can take lien to secure his claim, but it is of no particular value to him. He can enforce his claim without taking lien. The details of the lien law differs in various states. In some instances it is necessary to notify the owner by those who are to furnish material and labor, of their intention so to do. Otherwise they can make no future claim against the property. Again, those who furnish material only are required to furnish this notice. In other cases, the owner may find lien upon his property after settlement is made, which liens may be enforced without notification. This, of course, is according to the forms of law in the different states. We claim that this law, no matter what its details may be, which gives recourse against the owner of the property by those who have furnished material to the general contractor, does not benefit the general or sub-contractor who intends to do a respectable business. In nearly every city there is a lot of disreputable contractors who will bid to take work at any price, and who could not secure credit to buy material or labor were it not for the operations of the lien law.

Take the case of the stone-cutters: bids are asked upon the work for a certain building. Generally speaking, the lowest bidder gets the work. It frequently happens that there are propositions so ridiculously low that a respectable margin or profit, or even any margin at all, is not possible. The contract is awarded, and possibly the contractor furnishes a bond, maybe not; in any event, the work is done for less than it is worth. Material is furnished to those contractors with the knowledge that if it is not paid for by them, or out of the contract price, that those who furnish this material are in a position to make claim against the owner. Notification is given and possibly the difference between a fair price and the price at which the work was taken is paid by the owner or the bondsman. It is a remarkable fact that even the most disreputable of contractors are frequently able to inveigle their friends into going on their bonds. The point is that the work is let for less than it is worth, and the prices are demoralized. No one is benefitted. The owner may get his work for less than it is worth apparently, but there are always mitigating conditions which off-set any difference which there may be between a fair and a low price—possibly in annoyance of making a settlement, frequently in neglect of the workmanship, if not in a positive financial loss. There is always something coming up which is troublesome and expensive in connection with work of this kind. A contractor who has no credit and who care for none, is not usually one who is particular in his work. It is a truism that the man who does not know how to do good work, who does not intend to do it, cannot be made to do it. We are inclined to say that the lien law is the cause of loss to all respectable builders and contractors, principally for the reasons as above stated. It affords disreputably inclined workmen an opportunity of buying material and labor, without which they could not enter into competition with those who are willing and capable of doing good work.

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A firemens' monument is to be erected in Boston. It is to be 35 feet high and built of granite.

Cement works are contemplated at Clifton, Tenn.

THE INFLUENCE OF SUGAR UPON CEMENT.

Although the use of sugar to increase the strength of cement has been an immemorial custom in India, the subject has had additional light thrown upon it by experiments made by Mr. Harry De B. Parsons, M. Am. Soc. M. E., assisted by Mr. Henry Hobart Porter, Jr., E. M., and detailed in a recent paper before the American Society of Mechanical Engineers.

The first experiments were made with refuse molasses from a sugar refinery, 1 per cent. being added to 35 per cent. of water by weight, for gauging the cement: the cement used being the Dyckerhoff Portland.

As compared with a mixture of neat cement the increase in strength was much less rapid, and up to three months had not obtained the same strength; the strengths being 353⅓ and 456⅔ pounds per square inch respectively. Mixture containing molasses showed, however, a tendency at that age in strength more rapidly than the other.

As there were practical difficulties in the use of molasses owing to the rapid chemical changes in the mixture, additional trials were made with pure crystalline sugar. These were made with both the Dyckerhoff and the F. O. Norton Rosendale cements.

In the latter case 40 per cent. of water was used. All results are averages of three or four samples, and they are given in the following tables:

TESTS WITH DYCKERHOFF CEMENT (PORTLAND).

Time of tests.	1 Day.	2 Days	1 Week.	2 W'ks	4 W'ks.	2 Mo's	3 Mo's.	4 Mo's.
Neat	70⅓	160	298⅔	383	446	446	456⅔	485⅓
With ⅛ per cent. of sugar	9		51⅓		489		522⅔	565⅔
With ¼ per cent. of sugar	4⅓		41½		411		553⅔	
With ½ per cent. of sugar	2		34⅓				527⅓	571⅓
With 1 per cent. of sugar	2		47		403⅓		572⅓	
With 2 per cent. of sugar	2		60		334		537⅓	

TESTS WITH F. O. NORTON'S ROSENDALE CEMENT.

Time of Tests.	1 Day.	1 Week.	2 Weeks.	4 Weeks.	2 Mo's.	3 Mo's
Neat	47⅔		63	118⅓	255⅓	265⅔
With ⅛ per cent. of sugar	15	23⅓	27	74	245⅔	299⅔
With ¼ per cent. " "	27⅓			99	248	301½
With ½ per cent. " "	5			76	154⅓	261
With 1 per cent " "	1				34	181⅔

The effect of the saccharine matter is to retard the setting of the cement; and the subsequent excess of strength the authors judge to be more mechanical than chemical, the sugar by this retarding effect giving time for the chemical changes to take place more perfectly.

The greatest increase of strength seems to result by the addition of ⅛ to ¼ per cent, and the maximum excess to be about 20 per cent. This very slow initial setting will undoubtedly prevent the process from coming into use; and if it be true, as is stated, that the sugar seems still to exist in a crystalline state in the interior of specimens, the gain of 15 to 20 per cent. is probably only apparent, and the cement would be equally strong without the sugar after the lapse of sufficient time.—*Construction Record.*

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A TWO-EDGED SWORD.

When the brownstone rubbers of New York city struck in 1886, the bosses induced the Association of Architects not to include rubbed stone in their plans, and to use rock-face and tool-work instead. The architects then persuaded all intending builders not to use rubbed stone by recommending the other kinds as better and more fashionable. By this move 600 of the 900 rubbers have been shut out of their trade ever since.

CONVENTIONAL SPECIFICATIONS.

IN speaking of the stereotyped form of clauses and the conventional manner of making them into a specification of the whole, or of copying the same old form of specification over and over again, with a few alterations as to dimensions, the *Building News* says:

Specification-writing, like legal draftsmanship, has rather obscured than made clear the duties of those who are entrusted to carry out the intention of the author. In both of these forms of professional prescriptions, the verbiage is by no means any gauge of the comprehensiveness or clearness of the draftsman; sometimes, indeed, the greater the verbosity the more doubtful is the meaning conveyed. Nor is curtness of phrase always a sign of clearness and intelligibility. It often is a substitute for knowledge and precision. Such a clause as "All the materials to be of the *best* quality and approved by the architect" conveys very little information. The word may mean "best" of a certain kind; it may imply best of the kind generally used by the architect, not necessarily the best quality that can be procured or best for its application. These adjectives, however, embody in any easy uncompromising sort of way what is nevertheless to be inferred, without committing the writer to any statement that would expose his ignorance of materials. It is not at all unlikely that some of the vague clauses found in specifications are derived from the descriptive agreements of tradesmen who have supplied materials and workmanship, and who were careful not to bind themselves to any exacting terms. Definite prescription requires an extensive knowledge of materials, trade-marks, and the methods of workmanship, a degree of attainment that can only be expected from knowledge and practical experience. A young architect would, for example, be safer to describe the stone to be used, "to be of the best quality, free from all vents, shakes, and other imperfections," than if he were to describe a particular quarry without knowing the different beds and qualities, which would tie him to the acceptance of perhaps an inferior stone. So with regard to timber. The customary clause is that the timber is to be from the Baltic, or "to be of the best Dantzic, Riga, or Memel yellow fir," though there are few architects who obtain the best from either of these ports. A more experienced architect who knew something of the timber trade would be contented if he could be sure of getting medium quality Memel or Dantzic, from some well known shipper. A favorite clause is that "no Swedish timber is to be used," though it is worth notice that "mixed" quality Swedish red or yellow deals are often better than so-called first quality Baltic. The specification phrase—"the best timber"—means, in the timber merchant's vernacular, straight-grained timber, free from knots. Probably there is more room for evading the intention of the architect in this part of the specification than in any other; so many characteristics go to make up good timber—the mode of growth, time of felling, and nature of the soil. * * *

To avoid stereotyped phraseology, the result of copying one specification from another, the profession may do something. At present the tendency is to repeat a good general form *ad infinitum*. Specialization is avoided as being inconvenient, and local peculiarities of material and workmanship are not favored by the writer. On the contrary, the clauses are dictated by a knowledge of the materials of a very general and often imperfect nature. It is the information that has been picked up in the office during the apprenticeship; acquired not from contact with quarrymen, brickmakers, timber importers, and workmen engaged in building, but more from office traditions. Once a general form has been adopted, it is transmitted to future generations. A special form for each new building would be exceedingly laborious and inconvenient, and to some extent certainly unnecessary. But clauses are repeated so often that they lose their original significance and force. Contractors get to look contemptuously upon an official jargon that they know has been applied to hundreds of very dissimilar cases. We may give a few illustrations. The conventional specification reads: "The mortar is to be compounded of stone, lime and sharp, clean sand, mixed together in the proportion of one of lime to two of sand." The contractor takes little notice of the formula. The proportion is not attended to, there is no test specified, and the lime may be anything but fresh. Then, "sharp, clean sand"—how often we find sea-sand instead of clean pit sand. The clause has been interpreted in such a manner as to disarm criticism; the germs of mischief appear on the wall, but nothing can be done to rectify the mistake. Again, as to the concrete or Portland cement, the ordinary clause is based on imperfect data. High tensile strength is generally made a condition, whereas the more practical test is the adhesive strength. It is well understood that the tensile test depends on several circumstances—the atmosphere, the mode of manipulation, temperature of water, etc., and may therefore be very misleading. Air slaking is a very important condition, but seldom insisted upon. The cement may be over-limed, which gives a high result at seven days, but is found to lead to expansion and cracking of the concrete mass. A tensile strength of 350 pounds per square inch at seven days increasing with the age is preferable. Mr. Mann suggests the following specification for adhesive strength: "The Portland cement shall be ground so that no more than 45 per cent. shall stopped by a No. 176 silk sieve, and its adhesive strength after 28 days' immersion shall be 95 pounds per square inch cement, as supplied for use, not less than 75 pounds per square inch. Six tests being employed in each case." The No. 176 silk sieve gives 30,976 meshes per square inch.

Reference is made to the stereotyped phrases used in other trades but the above is ample to show that in England the same objections exists and the same questionable want of knowledge of details are to be found in specifications that we so often find here among the incompetent young men who "hang out their shingles" after being a year or two in an architect's office, and get work from impecunious builders and owners because they are satisfied to work for nothing, or next to nothing, while they are "making a name."

STONE-CARVING.

A GREAT deal of the ornamental stone-work which has been done in some of our best buildings in recent years has been cut after the stone was in position. This is common indeed in the larger cities. Within a short time this process was rare. We can remember in 1873 that in Boston the practice was only then coming into general use. It was introduced by a number of architects who had studied abroad. At that time in a number of cases it was more of a fad than a necessity, as considerable stone-cutting was done in the building which might better have been done elsewhere. But as the general character of the design changed, work of this kind became more rational. Though in some cases, as at the present time, it was carried to an unwarrantable extent. The practice of stone-carving was probably developed most fully in France where an extended use is made of the soft Caens stone. There the moldings as well as the more ornamental carved and decorative portions are worked out on the building. It is quite absurd to do this to its fullest extent in the case of granite, hard limestone and even brown sandstone as was done to a certain extent in the East several years ago. Certain carved and highly decorative portions can best be done after the building has been finished otherwise. But a mere mania for imitating foreign methods without the exercise of reason, is absurd indeed. Some of the foreign methods of building are better than ours. Some of them are not so good. If we can only use sense enough to discriminate we will be fortunate indeed. The extremes of patriotism or mania for foreign imitation are alike unsatisfactory. We remember a visit to Trinity college at Hartford, a few years ago. They had some very beautiful buildings after the designs of Mr. Burges, the English architect. They had his work in all its beauty but they had not imported the English climate; they had the same old New England climate with English windows, sashes and English grates. We were in a number of students' rooms and found them cold and miserable. There is nothing better than the American windows for the Northern American climate, particularly that of the colder portion. The English windows are suited to the English people and their climate. This illustration is used for the purpose of its general application in all details of building work. In the matter of stone-carving there is no need of doing it in the building merely because some one else does it. It may be done because there is a good reason for it. Under certain conditions the reason may not exist. Mere imitation is a sign of decadence.

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The Irondale, Ala., Land and Improvement Co., will open a stone quarry.

AMERICAN PORTLAND CEMENT.

THE production of American Portland cement, while it has thus far been comparatively small, is increasing, and particularly within the past few years considerable interest has been shown in improving methods of manufacture and machinery, so that competition with foreign producers is becoming more and more favorable to the American manufacturers.

Most of the cost of producing Portland cement being that of labor when the processes of manufacture are the same, the foreign producers have of course a great advantage in cheap labor, but there are indications that this advantage will be offset in this country by signal improvements in methods, whereby workingmen are replaced by machinery, which is expected to effect a great saving of time, space and interest on capital. Judging from all present indications the manufacture of American Portland cement, now in its initial stages, will increase with rapid strides during the next few years.

The demand for the best mortar to be used in buildings rapidly erected is becoming more and more pronounced. Lime mortar, requiring external influences in the setting process, does not contract uniformly on both sides of walls, one of which is freely exposed to the atmosphere and the other more or less protected from it. Cement, on the other hand, containing within itself all the elements necessary to the setting process, is not open to the above objection, and can be used without danger of setting and sliding due to unequal hardness in different parts of the walls even when the superimposed weight is rapidly added without allowing time for chemical or physical changes in mortar.

The scientific investigation of cements of all kinds is at present claiming considerable attention, and its results are to some extent becoming manifest in the care shown by manufacturers to maintain and, if possible to improve, the quality of their products.

The subject of properly testing and comparing the different kinds of cement in use is, however, one to which more attention might well be given by competent and unprejudiced authorities.

As compared with the imported Portland cement, the American Portland may be said to be far superior to a large number of imported brands; but it is also true that a considerable number of the imported articles are in turn superior to the American.
land, and interest. The form of the material, its uniformity in density, porosity and size, make it more easily burned, handled, crushed and ground, and make it a saving at every stage of the process; while the addition of the pitch aids the uniform burning,

A considerable variation existing at present in the modes of testing cements is unfortunate, and makes it very difficult to arrive at a correct conclusion in all cases as to the comparative merits of different articles.

The following description of the process of manufacture used by the American Improved Cement Company at their works at Egypt, Penn., is taken from a paper by Mr. R. W. Lesley, and read before the Engineer's Club, at Philadelphia:

"The material used in the manufacture is a hydraulic limestone or cement rock containing the proper chemical ingredients. The process is briefly as follows: The raw rock is crushed and ground dry. The powder thus formed is run into a mixer, when a small proportion of pitch and water is added. The moistened powder is then passed through a pair or heavy rolls, having matched egg-shaped cavities, which mold into small eggs and deliver these latter in front of the kilns, avoiding all handling. These eggs can be used the same day in the kilns if necessary, whereas under the old processes the same stage of manufacture required weeks, a
nifest advantage, to say nothing of the immense saving of labor,

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and, moreover, by forming pores, through which the moisture in the eggs escapes, prevents them from falling away in the kiln, which they would otherwise do, owing to the generation of steam within them and the formation of crust on their outer surfaces. This is the point which in the old processes prevented placing the wet paste in the kilns promptly, and which is here overcome by the use of a combustible. By this process the foreign brands are fairly met in point of price, and repeated tests by leading authorities here and in Europe show that the quality of the cement made is equal to the foreign Portland."

An article by R. J. Friswell, in the London *Engineer*, March 4, 1887, gives an account of "Ransome's improvements in the manufacture of Portland cement." After describing the old process of manufacture and pointing out its lack of economy and various other disadvantages and defects, the author says:

"It will be seem from the above that the processes of burning and grinding the cement are by far the most costly of all the operations involved in its manufacture, and that they are beset with defects, both scientific and practical, of a very serious nature. It is evident that if any great improvement is to be effected in the manufacture, the most serious attention must be directed to those portions of the process. It is, therefore, to this part of the work that Mr. Ransome has directed his attention. Taking as his guiding principles economy of fuel, space, and labor, he has devised the following process:

"The 'slurry,' prepared by any one of the methods now in use, is dried on a floor heated as usual, or by waste gas from subsequent processes. The soft, friable and easily crushed blocks are now reduced to coarse powder, and are then ready for burning. The old kiln is totally abolished, and in its place a cylinder of boiler plate is used. This is lined with good refractory fire-bricks set in fire-clay, and about every fourth row the bricks are set up on end, thus producing a number of parallel longitudinal feathers or ridges extending completely through the cylinder from end to end. The outside of the cylinder is provided with two smooth rings or rails of iron. In the center a third rail is wrought into teeth, in which a worm is rotated at a slow speed. The two rails rest on friction rollers, and the whole cylinder being set at an angle with the horizon, is caused to rotate slowly. This construction, though appearing somewhat formidable, is in practice extremely simple, and similar machines, known as 'black-ash revolvers' or 'revolving black-ash furnaces,' have long been and are now in daily use in alkali works. The cylinder is mounted on the top of a brick-work chamber divided by interior walls of bricks. The two outer chambers are filled with bricks piled in loosely, chequerwise, so as to present a large surface. Supposing a cylinder to be started, the operations will be described. A gas-producer being in working order and delivering its gas at regular rate, it is lighted and the flame passes through the cylinder, which, in the course of a few hours, attains a white heat. The waste heat from the revolver has also passed through and heated the right-hand division of the generator to a bright cherry red. A shunt valve is now opened, causing the waste gases to pass through the left-hand generator, while the gas from the producer is caused to flow through the heated right-hand chamber, and thus arrives at the mouth of the revolver already intensely heated. The result of this is that an immediate economy of fuel is produced, and to avoid overheat it will be necessary to reduce the gas supply. During the whole operation the air necessary for combustion is also heated by passing down a separate division of the regenerator, where it receives heat from the walls of the outer compartments. As soon as the right-hand chamber begins to cool, the furnace-man reverses his shunt valve, and the fresh gas is turned through the hot regenerator, while the waste combustion products are heating that which has cooled down. The effect of this method of working is to return into the furnace the heat which in ordinary methods of work goes up the chimney. No startling innovation occurs save in the application of the method to cement making. Regenerative furnaces are in use all over the world, and an intelligent furnace man will learn how to manage one in a few hours.

"We have now to turn our attention to the cement, which, taken from the drying floor, we described as crushed to a course powder. The powder is lifted by any convenient mechanical arrangement to a hopper, placed at the upper end of the revolver; from this it falls in a steady shower *through the flame* to the lower side of the cylinder, and lodges between the feathers. As the advancing side of the cylinder rises it is lifted until the feather attains such an inclination as to shoot it off again through the flame to the bottom once more, but owing to the incline, several inches nearer to the lower end. As the revolver moves on, this operation continues again and again, the powder is constantly lifted and shot through the flame in showers, gradually getting nearer and nearer to the lower and hotter end of the cylinder, until at last it falls out into a receptacle at the lower end. In practice it is found desirable to rotate the cylinder at such a rate that any given particle of cement takes about thirty minutes to travel from one end to the other, during which time it has been lifted and shot through the flame about fifty times.

"The powder has now arrived at the outside of the furnace, and having been delivered onto a floor to cool, is at once ready for grinding; that is, it is in the same state as the clinker after being seven days in the kiln. Unlike cement clinker, however, it does not consist of lumps weighing from 14 pounds downward, and as hard as granite, but of a coarse sand. Nor does it consist of an overburnt skin, a properly-burnt inner portion, and a possibly underburnt center; but if the operation has been properly carried out, each fragment has been heated to exactly the proper degree. Again, the fuel used is gaseous; consequently no mixture of coke ash has taken place, and the cement is really what it professes to be.

"The next question to be considered is the economy of fuel effected by the use of gas-producers. Instead of consuming coke, these require only to be fed with slack, coal dust, or anything that will burn, fed in at intervals through the hopper. A two-cylinder works would require for its daily service probably one gas-producer capable of converting about six hundred weight of slack per hour into gas.

"These producers are chambers of brick-work in which a portion of the fuel burning converts the rest into gas, a small jet of steam being blown in.

"The results derived from this plan of gas firing are: (1) Possibility of working with regenerative furnaces, thus saving all heat passing from the revolver; (2) use of about three hundredweight of cheap slack per ton of cement instead of seven hundred weight of coke; (3) complete combustion of all fuel, the steam injected being decomposed by the red-hot cinders, and producing carbonic oxide and hydrogen; (4) the cement is kept entirely free from fuel ash.

"In addition the revolver gives us the following advantages:

"(1) Economy of space, two revolvers with their appurtenances,

"(2) Continuous working day and night;

and one in reserve covering 900 square feet, turning out the same weight of cement as eleven kilns covering 4,400 square feet;

"(3) Less frequent need of repairs, as the continuous heat involves no racking like the alternate heating and cooling;

"(4) Economy of repairs, which are simple and cheap;

"(5) Economy in first cost;

"(6) Economy in grinding, a granular sand being produced instead of lumps of clinker, whereby crushers are quite abolished, and the wear and tear of the millstones greatly reduced;

"(7) Economy of hand labor. Revolver cement can be handled on the American elevator system;

"(8) Improved quality from (*a*) non-mixture with fuel ash; (*b*) neither over burning nor under burning;

"(9) Increased control over the quality of cement, it being possible to stop, increase or diminish the flow of crushed slurry and to vary its quality at any time;

"(10) Fewer losses by accident. The ordinary kiln once charged and fired must burn out, whether charged wrongly or rightly, while, as before stated, any error in material can be rectified in a revolver as soon as discovered.

"(11) Perfect control of temperature;

"And, lastly, power of varying the temperature according to the nature of the material.

"In addition to the method of burning just described, Mr Ransome has introduced another improvement, which however is available only in certain districts. This is the introduction of a new material in cement-making in the form of blast-furnace slag."

THE LANGUAGE OF PRECIOUS STONES.

The quality of turquois imparts a prosperity in love.

Chrysolite was used as an amulet against evil passions and despondency.

The opal imparts apprehension and insight, and is the emblem of unrealized hope.

Conjugal felicity was symbolized by the sardonyx, which it was believed to insure.

The topaz was thought to promote fidelity and friendship, and calm internal passions.

The diamond has the mystic symbolism of light and purity, faith and uprightness of character.

The properties of the amethyst are to calm the passions of the body and prevent drunkenness.

The bloodstone was thought by the ancients to impart courage, prudence, fortitude, and stability of character.

The moonstone was the emblem of the merchant prince, and signified well-directed industry and the arts of peace.

Garnet or carbuncle represents constancy of purpose and fidelity to duty. It is pre-eminently the soldier's gem.

The ruby was thought to guard against unfriendliness, and particularly that form so common in antiquity—poisoning.

The sapphire signifies modesty and charity of opinion and was thought to possess the power of breaking the spells of magic.

The agate or chalcedony represents physical prosperity, and it is the stone of the athlete and physician, and imparts longevity and health.

The emerald symbolizes truth, and was believed to secure good faith and happiness in friendship and home. It was also the appropriate emblem for a judge or lawyer.

SHOOT THE DOVES.

"Would you like a white dove placed above the tombstone?" he asked of the widow. "No, sir, I think not," she answered with a sigh; "our next door neighbor used to keep doves, an' it was all could do to stop John from shootin' 'em."—*Troy Times.*

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It is said that less than one per cent. of the building material of New York City is of stone.

GOVERNMENT ARCHITECT'S OFFICE.

THE architects ot the country are using their best endeavors to have changes made in the work of the government architect's office. It is a fact that the work of this office is not a credit to the country in matters of design. In construction everything is satisfactory as far as is generally known. The work is inordinately expensive for various reasons, which might be named, but it is most at fault in matters of design. There is effort enough, in an irregular, unsystematic way, but it is not properly directed, and there is not knowledge enough. The Chicago postoffice and custom house as every one knows is a wretched affair. The New York postoffice is crude, indeed; the same may be said of that of Boston. The Philadelphia building is large and imposing, but ugly. The Cincinnati structure which has been in the office during the administration of several of the architects is of the same type. It is large, massive and ugly.

It is the desire of the architects of the country, that the government work should be of the highest type, rather than of the crude, common character which has made its record in the past. To that end they are working. It is their desire to have the design at least cared for outside the government office, design to be selected in competition, restricted and judged by competent authority. The business or executive part of the work might be under government control, but all designs and details should be cared for according to the general plan which the architects had in mind. The following is from a communication of Mr. Adler to the *Inland Architect*:

> Upon the matter of causing the designs of government buildings to be made outside of the office of the supervising architect by the victors in competitions arranged specially for each particular building, we found that Mr. Freret did not agree with our committee nor with the profession at large. We believe, however, that the intentions of Mr. Freret were of the best, and were convinced that a little more experience in the management of his office would demonstrate to him the futility of his efforts to produce the highest grade of work (which he is undoubtedly striving for) when his own time is taken up with so many details of administration, and when this work is crowding on him to such an extent (there are now in hand eighty buildings, costing upward of $21,000,000) that even were he relieved from the routine of administrative work, he would find that no one mind could do justice to the artistic requirements or solve the engineering problems incidental to such an aggregation of buildings. It is our belief that Mr. Freret is honest, ambitious and zealous, and that he will, as soon as he has felt the full force of the difficulties which beset him, conclude with us that if the national government is to secure architectural service at least equal to that engaged by its individual citizens, it must desist from burdening a single official with tasks sufficient for any twenty of the best architects in the country. We therefore deemed it expedient to postpone the introduction of the bill prepared by Mr. Bell, and amended by the committee, to a future date, when we hope Mr. Freret will join us in our support of that or a similar bill.

THE TESTING OF MATERIALS FOR MORTAR.

In the eleventh annual report of the executive board of the city of Rochester, N. Y., appears a special report on cement mortars for use in public work. Professor Charles D. Marx and Alfred M. Mosscrop, of Cornell University, did much with the experimental work, and their investigations shows a decided advance in this line of research.

In addition to the usual tests of strength by breaking briquettes, the sand was tested to determine its "voids." The ground was taken that sand whose grains lie close together, presenting a minimum of voids, is the best for making mortar and cement. The method of testing was to ram dry sand into a graduated cylinder, and then to introduce by siphonage enough water to flood its upper surface. The volume of water gave the amounts of voids. Cements were tested in the same way, but in this case, by a suggestion of Professor Fuentes, coal oil was used as the liquid. The general deduction from the tests was that the larger the amount of fine material, the worse the sand for mortar. Yet a certain amount, not exceeding twenty per cent of fine siliceous matter, may be admissible.—*Scientific American.*

A CORRECTION.

In the stone tests made by General Gilmore, which were published in the last number of STONE, it may have been noticed that there were a number of specimens which showed bad indeed. To one not acquainted with the stone market of this section this fact would not appear significant, it would merely indicate that the stone was not of a satisfactory quality. In truth, some of the worst samples, as indicated by the tests, were from some of the quarries which were known to be entirely satisfactory as to their product at that time, and have since met with a pronounced success in a business way. How could this be? Professor Collett explains it. He was, at the time the tests were made, a member of the state house commission and subsequently state geologist. He was instrumental in having the work done. As soon as the result was made known publically, he went to the quarries in question to see what was the matter. The quarrymen themselves did not understand it. In one particular case the owner said that he had sent Pat to get the samples. "Where is Pat," said Professor Collett, "bring him here." "Well here he is." "Pat, where did you get that sample of stone?" asked Professor Collett. "Right over here out of the pile," and he pointed to a lot of rubbish, and a place where they had been burning some logs. "Why did you get it there; why didn't you get it from the quarry?" Pat didn't know. He probably thought that stone tests were all nonsense anyhow. In another case the samples were dressed after being screwed up in a vise and were subjected to all sorts of iniquities before being brought to the attention of the expert. The result was that they made a bad showing. This was true of the stone from the following quarries: Dunn & Co., Hege & Jackson, Dark Hollow Stone Co., and Simpson & Archer.

PROPOSED ABOLITION OF DUTY ON CEMENT.

The proposition to place cement on the free list in what is known as the Mills Tariff Bill has brought out a statement from those interested in the cement industry in this country, which we publish in another column.

Cement is certainly a manufactured article. In view of this fact, therefore, and that even tariff reformers only urge that strictly raw materials and articles not produced in this country be put on the free list and are agreed that the tariff on articles should be so adjusted as to interfere as little as possible with the wages of laborers in the United States, it would seem that the abolition of the small existing duty of 20 per cent. on cement is not justified. The result would be to lower the rate of wages of those engaged in that industry, and check the manufacture and increase by at least a portion of that 20 per cent. the income of foreign manufacturers. —*American Architect.*

A NEW MONTHLY.

The D. H. Ranck Publishing Co., of this city, have issued the first number of a 32-page monthly, with title of STONE. The pages correspond in size to those of the *Clay-Worker*, but they are divided into two columns instead of three. The work is to be devoted to stone in all its varied relations. It proposes to discuss the qualities of stone and its various adaptations in architecture and in other arts the methods of working it from the quarry to the finished block in position, and the several uses to which stone may be applied. The first number makes a very creditable appearance both in its matter and typography, and is profusely illustrated by engravings. STONE occupies a field which in this region has been vacant hitherto. In no point have our builders blundered worse than in the selection of stone for exposed situations. We welcome STONE, and hope it will achieve success by deserving it.—*The Clay Worker.*

A CINGALESE ROCK FORTRESS.

For the first time for a number of years, the Sigiri Rock, in Ceylon, has been scaled by a European, the feat on this occasion being performed by General Lennox, who commands the troops in the island. It is said, indeed, that only one European, Mr. Creasy, ever succeeded in reaching the summit. The rock is cylindrical in shape, and the bulging sides render the ascent very difficult and dangerous. There are galleries all round, a groove about four inches deep being cut in the solid rock. This rises spirally, and in it are fixed the foundation bricks, which support a platform about six feet broad, with a chunam-coated wall about nine feet high. The whole structure follows the curves and contours of the solid rock, and is cunningly constructed so as to make the most of any natural support the foundation can afford. In some places the gallery has fallen completely away, but it still exhibits flights of fine marble steps. High up on the rock are several figures of Buddha, but it is a mystery how the artist got there, or how, being there, he was able to carry on his work. The fortifications consist of platforms, one above the other, supported by massive retaining walls, each commanding the other. Owing to the falling away of the gallery, the ascent in parts had to be made up a perpendicular face of the cliff, and General Lennox and four natives were left to do the latter part of the ascent alone. The top they found to be a plateau about an acre in extent, in which were two square tanks with sides 30 yards and 15 respectively in length, cut out of the solid rock. A palace is believed to have existed on the summit at one time, although time, weather, and the jungle have obliterated all traces of it. During the descent the first comer had to guide the foot of the next into a safe fissure, but all reached the bottom safely after two hours and a half. It is said that the amount of work expended on the galleries is incredible, and the writer of the account of the feat doubts if all the machinery of modern times could accomplish the stupendous work that was achieved here in old days by manual labor alone.—*Scientific American.*

AN ODD FACT ABOUT GUN COTTON.

When gun cotton or other high explosives are freely exposed upon an iron anvil and detonated, says a chemical expert, the explosive leaves a deep and permanent impression upon the surface of the metal with which it was in contact. The impression produced by the exploding mass is an almost exact copy of that face of the explosive which was in contact with the metal. This is best observed with gun cotton, for, from the nature of the material, it can be shaped according to fancy, and such figures and designs as one wishes can be stamped upon its surface. Thus if a disk of gun cotton, on the face of which the letters "U. S. N." and the date "1884" are indented, be detonated, it will be found that the letters and figures will be reproduced in the iron, and most singular of all these phenomena, they will be indented in the iron just as they were in the gun cotton.

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Dynamite is so instantaneous in its action that a green leaf can be compressed into the hardest steel before it has time to flatten. One of the experiments at the United States Torpedo Works was to place some leaves between two heavy flat pieces of iron, set them on a firm foundation and see what gun cotton would do in forcing the iron pieces together. A charge was placed upon them by compressing the gun cotton into a cylindrical form about one inch thick and three or four inches in diameter, through the center of which a hole is made for a cap of fulminate of mercury, by which the gun cotton is exploded. The reaction was so great, from merely being exploded in the open air, that one of the iron pieces was driven down upon the other quick enough to catch an impression of the leaves before they could escape.

THE NEW YORK CAPITOL ASSEMBLY CEILING.

It may be known that the vaulted stone ceiling of the assembly room in the New York state capitol has given a great deal of trouble because of its settling, and consequent fracture from causes not fully determined. The commission in charge recently gave it as their opinion that the ceiling should be replaced by a much lighter structure of wood or metal, which for acoustic reasons they suggested should be flat. At this the architects protest in the following language:

The Commission appointed by the Assembly during the present session, whose report of April 26, 1888, is now before us, sums up the defects of the Assembly Chamber by the statement that

"The ruin of the vaulted ceiling is due to the fact that the design and method of construction and the loading of these arches and vaults have been such as to give pressures which have resulted in the disintegration of the structure."

This means that these vaults are either not in equilibrium or that they have been out of equilibrium in the past, and that the injury done at that time has not been repaired, or both, and this conforms to our own conclusions and those of the Commission of 1882.

The present Commission nevertheless recommends the demolition of the vaults and of various other masses of masonry, and the substitution of wood, metal and slate, in order "not to throw lateral pressure on the outer walls, and so as to load the supporting walls below the Assembly Chamber as little as possible." Inasmuch, however, as in fact the present ceiling throws no lateral pressure on the outer walls, as the supporting walls below the Assembly Chamber are not overloaded, and as the Commission itself reports that "the settlement of the foundations has been slight and not very irregular," thus showing that they are not overloaded, the extensive demolition proposed seemed to be quite unnecessary. The deterioration, the cause of which we have already explained, has advanced so far since 1882 that in place of the "slight repairs" we then recommended it may now be necessary to reconstruct the three central vaults; but we can see no reason, engineering, architectural or economical, why the vaulting should be replaced by "a ceiling of wood or of metal." If it would be discreditable to the state that the vaulted ceiling should fail, through unscientific construction or through neglect, it would be less discreditable to the state that it should be superseded for insufficient reasons. All of which is respectfully submitted.

Eidlitz, Richardson & Co.

May 3, 1888.

SCALE OF WAGES

at present in force in New York City:

Brownstone cutters, $4.50 per eight-hour day, May 1 to Dec. 1, and $4 per eight-hour day Dec. 1 to March 1.

Marble rubbers $2.50@3.00 a day,

Marble polishers $2.50 a day.

Marble sawyers, $2.00@2.50 a day.

Framers 40 cents an hour, nine-hour day, eight hours on Saturday.

Stone masons, $4 for nine-hour day.

Marble cutters $3.00@3.50 nine-hour day, eight hours Saturday.

Bluestone cutters and flaggers $4 for a nine-hour day, eight hours Saturday.

Granite-cutters, $3.50 for a nine-hour day, eight hours Saturday.

Brownstone rubbers, $2.50 for a nine or ten-hour day.

Rock drillers $2.75 on contract work, $3.25 on foot work for a ten-hour day, eight hours Saturday.

Quarrymen, $2.50 for a nine-hour day, eight hours Saturday.

TROUBLE OVER IMPORTED WORKMEN.

The stone-cutters of Kansas City talk of prosecuting the Missour Valley Stone-cutters' Association for inducing English stonecutters to go to Kansas City as soon as they arrive at Castle Garden on the representation that there was no strike in that city. The Englishmen are union men and in poor circumstances.

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The *Progressive Age*, the leading gas journal of America, has removed from Philadelphia to New York, and will be hereafter issued semi-monthly It is a remarkably successful journal in every respect.

A CORD OF STEEL FOR CUTTING STONE.

The following from an unidentified clipping from which we prepared a rewritten item in the last number of STONE attracted considerable attention. We here give it in full:

"A foreign contemporary recently described a new saw for cutting stone, consisting of a twisted cord of steel, made to run around pulleys like a band-saw. This apparatus has now been perfected and put into use. The cord employed is composed of three steel wires rather loosely twisted together, but stretched tight over the pulleys, and is run at a high rate of speed. The swift succession of blows from the ridges of the cord delivered along a narrow line disintegrate the stone rapidly, and the loosened particles entangled among the wires of the cord are said materially to help the erosion. However this may be, the effect of the saw, which is allowed to press lightly on the block of stone beneath it, is much greater than that of the ordinary blades supplied with sand, the usual rate of cutting in blocks of oolite or soft limestone being about 24 inches an hour, and in Carrara marble a little more than 9 inches an hour. The hard granite of Brittany is cut at the rate of nearly an inch and a quarter an hour, and even porphyry can be worked at the rate of eight-tenths of an inch an hour. In rougher cutting, such as is done at the quarries, the saw can be driven more rapidly and with greater pressure on the stone, and its efficiency is increased about one-third.

"In certain marble quarries in Belgium this process, which is known by the name of its inventor, M. Gay, is used on an extensive scale, the blocks of stone being not only divided for use, but extracted from the quarry entirely by means of the cord saw. In using it for quarrying a suitable portion of the surface of a stratum of marble is first cleared in the usual manner, and a drill is brought upon the ground resembling the diamond drill, except that the cylinder of sheet steel of which it is made has no diamonds set in the edge, but is fed with a hard metallic powder, apparently resembling the chilled iron sand used in this country for cutting and polishing granite. With this drill, which is driven by a pulley and rope, a little shaft is easily driven into marble at the rate of 2 feet an hour, cutting out a cylinder of stone 27 inches in diameter, which is then detached and lifted out, and forms a salable block without further treatment. Two of these drill-holes having been sunk at a suitable distance apart, guides are set up in them, on which move frames carrying pulleys of a diameter somewhat less than that of the hole, and over these pulleys a cord saw is stretched. Motion is imparted to the pulleys by a simple system of transmission, and the saw cuts without interruption until the bottom of the drill pits is reached. In this way blocks of any size can be taken out with a waste from saw and drill cuts amounting to only about one-half of 1 per cent., while the loss by the usual methods or quarrying is often 35 or 40 per cent. of the whole amount of stone extracted. The saving of time is even greater than the economy of material, the new appliances accomplishing, it is said, 15 times as much work in a given period as was possible under the old methods. We are not informed as to the life of the steel cord, but judging from the favorable report, it must be an efficient abrader."

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FROM QUINCY, MASSACHUSETTS.

An exchange says: Every one seems to be busy here now, and we never saw trade looking better at this season. If stock was plentiful, stone-cutters would be very scarce, and there is now no necessity for any man working at less than the bill of prices. There is no need either for any man to be in doubt as to the value of his work; all he has to do is to show his diagram to the walking delegate, who will tell him what he should get. That is his business, and he is well paid for it.

MAKING ROMAN MORTAR.

It might be well, says the *Industrial World*, to review how the ancient Romans managed their mortar, and see if there is anything to be learned on the mortar subject. The information in question is "fired" at the public with great caution, as it is well known (in Chicago) what a big strike a little matter will kindle. It would be hardly safe for the architectural readers to incorporate the following directions for mortar making into their specifications.

The famous Roman mortar, which has stood the test of use better than any other known to man, was prepared with great care. D'Avigdor says that the material now called Roman cement was a different affair, and was unknown to the Romans, nor did they use natural hydraulic limes or artificial Portland cement.

Their mortar was composed as follows: One part slaked (rich) lime; one part brick dust (known in India as Toorkee, and used there for the same purpose) and two parts clean river sand. If quarry or pit sand was to be had (which they preferred), three parts of the latter were substituted. The care used in storing the sand, lime and brick dust far exceeded the precautions now taken by the most strict engineers.

They excavated immense pits, lined them with masonry, and erected a roof, or even a vault, over them. Here the sand, after being screened, was secured from the weather. The lime was specified to be slaked a year before using. It was spread out in large sheds, and the slaking was carried on by the influence of the air almost without any admixture of water.

When hydraulic mortar was required, the Romans substituted puzzolana for the brick dust. This was carefully screened and kept dry. In short, the mortar makers of ancient Rome, who never did anything all their lives but mix mortar, went through their work with such care and accuracy that we should require a chemical laboratory to do as well.

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THE POTENTIAL ENERGY OF GUNPOWDER.

When gunpowder is burned the temperature rises to about 4,000° F., and the heated gases which are produced, if unconfined, have a volume several hundred times as great as the original volume of the gunpowder; but if confined in the space originally occupied by the gunpowder, they exert, according to Abel and Nobel, a pressure of about 95,000 pounds on the square inch, the total energy of a pound of powder being a little under 500 foot-tons. The energy manifested by exploding gunpowder has led many persons to imagine that this substance might be economically utilized as a motive power, and engines have been devised for this purpose; but a comparison of its potential energy with that of coal shows that, for equal weights, gunpowder possesses but one-tenth of the energy of coal, and that its potential energy does not equal even that of the carbon which forms one of its own constituents, while, moreover, its oxygen is supplied in a very expensive form. Besides, in its use in modern guns, the actual energy realized is only from one-tenth to one-fifth of the theoretical amount.—*C. H. Monroe in Scribner's Magazine.*

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STILL RESPECTABLE.

There is a tablet in an English cemetery with the following inscription: "Here lies the body of——, who for many years conducted a highly respectable general business in an adjoining village, which is now continued by his widow. N. B.—No trust given."

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The percentage of stone construction in New Orleans is very small. Very little stone is used even in foundations. The customary foundation with most buildings is to-day thick planks on the ground and lay brick upon them. The planks are in the water and do not rot.

THE RESISTANCE OF STONE TO CRUSHING.

Twenty years ago it was common in experiments on crushing to bed the test specimens of rigid materials, like stone, on lead plates, with an idea of securing uniform distribution of pressure on the faces at which the crushing pressure is applied. The author has long had the opinion that to support blocks for crushing on a plastic support is wrong in principle. Hence, in experiments on the crushing of stone, and of Portland cement and concrete, he has adopted the plan of preparing the faces on which the crushing pressure acts with a thin layer of plaster. This can be easily worked to smooth and parallel surfaces, used to receive the iron plates of the crushing shackles directly if necessary; but the author generally interposes a sheet of millboard, which is a very hard and only slightly compressible material. It seemed desirable to try what was the difference of the crushing strength of blocks supported in these two ways. Two series of 4-inch cubes of Portland stone and Yorkshire grit were obtained of very uniform quality. The results of the tests are given below. The author has been surprised at the very great reduction of strength which occurs when a thin plate of plastic material like lead is used on the faces to which the crushing pressure is applied. It will be seen that the pressure of blocks between lead plates is in one case only three-fifths, and in another only three-sevenths, of that of blocks prepared with plaster and crushed between millboard. One block was cemented carefully between two rigid iron parallel surfaces, and this carried a little more, but only a little more, load than the block prepared with plaster and crushed between loose millboards. An examination of the mode of fracture of the blocks shows why the lead has so dangerous an effect on the strength. The blocks crushed between millboards sheared approximately at 45° in the way well understood, forming regular pyramids; but the blocks crushed between lead broke up into a number of vertical prisms with nearly vertical faces. The lead flowing under the crushing pressure produced by friction a tension in the block at right angles to the crushing pressure, tearing the block in pieces and completely altering the angle of fracture. The pressure of fluidity of lead is known to be from 1½ to three tons per square inch, and these pressures were exceeded in the crushing experiments.

The result seems important, because it is still a common practice to use lead, or deal, or some other plastic or compressible material in crushing experiments, and it is not generally known that this has the effect of diminishing the crushing resistance.

CRUSHING OF STONE BLOCKS, 4-IN. CUBES (APPROXIMATELY).

Description of stone.	Crushing load in tons,	Stress in tons per sq. ft.	
Portland:			
535	57.665	516.381	..... Between two millboards on each face.
536	52.600	469.872	......One plate of lead on each face.
538	15.65	108.8	......One plate of lead on each face ¼" smaller than face all round.
537	33.50	299.952	.....Three plates of lead on each face.
Yorkshire Grit:			
539	79.72	712.080	.....Between two millboards on each face.
542	80.05	716.86	......Cemented between two strong Iron plates with plaster of Paris.
540	56.20	504.132	......One lead plate on each face.
541	35.90	322.272	......Three plates of lead on each face.

The lead plates were 0.085 inches thick.

—*Manufacturers' Gazette.*

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THE GRANITES OF MINNESOTA.

The granites of Minnesota are adapted to a wide range of architectural uses. That most employed is from St. Cloud (No. 1); it is of a natural gray color, of rather fine, inconspicuously granular texture, and has a resisting strength of over 25,000 pounds per square inch. It resists fire and the sudden cooling produced by cold water thrown upon it better than the more quartzose and more coarsely granular rocks quarried at East St. Cloud and Watab. The other varieties, however, are more showy in construction, on account of their lighter color as well as their more close crystalline texture. Some of them will take and preserve a better polish, particularly Nos. 6 and 7, and are to be preferred for that reason for fine work, such as monuments or tablets, and for all inside trimmings. The syenite from Beaver Bay has a uniformly brownish red color and fine grain, and when polished is very beautiful.

These crystalline rocks have been used in some of the principal buildings in St. Paul and Minneapolis for trimmings, and have been sent for the same purpose to several other cities, particularly to Milwaukee, Chicago and Des Moines. At Sauk Rapids the fine gray syenite (No. 1) is made into monuments. Stone from the Sauk Rapids quarries was used in the trimmings of the state capitol at Des Moines, and constitutes the entire front wall of the block of Nichols & Dean, at St. Paul. It is that used for paving at Minneapolis and St. Paul. The trimmings of the U. S. custom house and postoffice at St. Paul were taken from the East St. Cloud quarries, and embrace all the principal varieties there found, *i. e.*, Nos. 1, 6 and 7. Much of the stone put into the bridge over the Missouri river at Bismarck for the Northern Pacific railroad, came from East St. Cloud, but at a point further southwest than the quarries of Breen & Young, and consists of another variety (No. 9) of syenite. This rock seems to have stood the physical tests to which Minnesota building stones have been submitted less successfully than the other crystalline rocks. This, however, may be due in some measure to the fact that in reducing a block for a test to the required dimensions with a hammer and chisel, it is more likely to be checked and weakened if coarsely crystalline, as this rock is, than if it be fine-grained; and some of the tests may have been influenced by such imperfection in the samples. Still, the greatest care possible was taken to avoid any unfavorable result from such a cause. The gabbro of Rice's Point, Duluth, has been employed in a few buildings at Duluth, both as cut trimmings and for rough walls. It has also been used for monuments and for bases, to which it is especially adapted, being cut under the chisel and polished more easily than any of the crystalline rocks that contain quartz. The same kind of rock at Taylor's Falls has been but little employed for any purpose, through the rock there is favorably situated both for working and for transportation.

The labradorie rock (No. 8) has a lavender-blue or bluish gray color, and is vitreous and subtranslucent in thin sheets. It does not have the opalescence which distinguishes the labradorie from the typical locality and from Lewis county, New York, but it has a compact, perfectly crystalline texture, with crystals as large as one-half or three-fourth inch across. In some of the "greenstone" at Beaver Bay are perfect crystals over two inches in diameter, distributed porphyritically in the mass, but this structure is very rare. This beautiful rock, when suitably handled, will constitute a valuable material for ornamental slabs and columns, and probably also for chinaware. Titanic acid, which is sometimes found in this rock, even in large quantities, is found in nearly all porcelain clays, at least in those of New Jersey, and suggests not only the possible origin of the kaolinic clays used for earthenware but also the adaptability of the undecayed rock to the same uses.—*Manufacturer and Builder.*

◆

The census office has aimed at system and uniformity in the collection of samples. The size is four inches square. The dress is as follows: Polished in front, drafted and pointed left side. Drafted with rock face, right side. Entire left rough. Rubbed on top, chiseled on bottom.

[Official Report of Messrs. Collett and Johnson to the Indiana State-House Commissioners.]

CONCRETE.

CONCRETE is a mixture of mortar (generally hydraulic) with broken stones, gravel or other coarse materials. Mortar is the cementing material which binds the coarser fragments together, and should be present in sufficient quantity to thoroughly fill all the interstices or voids between the fragments of the coarse materials. To guard against the errors of imperfect manipulation it is customary and proper to add an excess of mortar, usually from 40 to 50 per cent. over and above the amount of the voids.

The mortar itself is composed of sand and cement paste; the paste being in such quantity as will fill the voids in the sand, with an excess of 40 to 50 per cent. to cover imperfect manipulation. This paste is composed of cement powder and water, and occupies the same relation to the sand that the mortar does to the coarse materials. The sand exerts no chemical influence on the induration of the cement, but serves to diminish the shrinkage and consequent cracking in setting, and to cheapen the aggregate cost.

The tests were made with a given volume of each of the several materials and their mixtures; the method pursued being to fill a box of known capacity with the material to be tested and then to fill the voids with water, the quantity of which was accurately gauged as it was poured in.

For this purpose a water-tight wooden box was prepared, exactly two feet square and one foot deep, containing four cubic feet, as a measure of volume, and to contain the material to be tested. For the water, a smaller measure was made of xxxx tin plate, exactly six inches square and one foot deep, containing one-fourth of a cubic foot, or one-sixteenth of the larger measure. Within this was securely soldered a well graduated scale one foot long, divided to tenths and hundredths of a foot, so that each reading was an actual fraction of the large measure, indicating to one-four hundreth of a cubic foot, or one-sixteen hundreth of the box.

The materials tested were broken stone, gravel, sand, and several mixtures of these. The stone was hard limestone broken to the average size of a hen's egg; the gravel was well screened, and varied from fine to the size of a walnut; the sand was "damp" or "wet," as stated in the tables, and was well gritted, fairly coarse, and suitable for plastering; the cement was the "Black Diamond" brand of Indiana cement from the Louisville Cement Company.

Two series of tests were made; the first (given in table 1) was upon materials poured loosely into the box, and not shaken. The second (given in table 4) was made with materials well shaken in the box and thoroughly settled.

TABLE NO. 1.

Showing Tests made October 29 and 30, 1878, with loose unshaken materials:

No. of Experiment.	Kind of Material.	Quantity of Material—cubic feet	Small Measure of water.	Quantity of Water or Voids—cubic feet.	Percentage of Voids.	Remarks.
1	Broken Stone......	4.00	8.24	2.06	51.50	
2	Gravel............	4.00	6.04	1.51	37.75	
3	Wet Sand..........	4.00	5.26	1.315	32.87	This sand shrank in volume on the addition of the water to 3.62½ cb. ft., or a reduction in volume of 0.375 cb. ft.=9.37 per cent
4	Stone, 5 parts... Gravel, 3 parts.	4.00	6.28	1.57	39.25	10 measures of stone, with 6 measures of gravel, made 15 measures of the mixture, a shrinkage of 6.25 per cent.
5	Sand (earth damp)	4.00	6.36	1.59	39.75	This sand shrank, on addition of the water, to 3.72 cb. ft. being a reduction of 0.28 cb ft =7 per cent.
6	Stone, 5 parts.... Gravel, 3 parts... Sand 3 parts.....	4.00	5.16	1.29	32.25	These 11 measures of the materials made 9 measures of the mixture, being a shrinkage of 18.18 per cent

One small measure of dry cement powder with 0.38 measure of water, made 0.75 measure of stiff paste; or to make one measure of stiff paste will require 1.33 measures of dry cement powder and 0.51 measure of water.

Tables Nos. 2 and 3 are prepared from Table No. 1, in accordance with the principle heretofore mentioned, that the cement paste should be about 50 per cent. in excess of the voids in the sand, and that the resulting mortar should be about 50 per cent. in excess of the voids in the coarse materials.

These tables are based on the sand used in experiment No. 5, which was a clean, fine sand of nearly uniform size, taken from a sheltered bank just before the experiment, and was therefore "earth damp."

The sand in experiment No. 3 was taken from a pile of sand screened for use in the building, and which had been exposed to a heavy rain the day before the test, and contained an excess of water. It contained grains of mixed sizes and some loam. On account of the excess of water in this sand, no use has been made of this test in computing the tables.

In column A of the tables the numbers correspond to those of the several tests in table 1.

Column B gives the kind of coarse material; column C the volume of coarse material experimented on; column D the actual volume of voids as found by trial; column E the quantity of mortar required, being one and one-half times the voids; columns F and H give the quantities of sand and cement paste required to produce the volume of mortar in column E; column I and J give the quantities of dry cement and water required to produce the volume of cement paste in column H.

The quantities in the several columns, are obtained in the following manner:

Take for example experiment No. 5, which shows that one volume of sand contains 39.75 per cent. of voids. The cement paste for this sand should therefore be:

Voids	0.3975
Fifty per cent	0.1987
Cement paste	0.5962 (say 0.60)

In mixing these we assume that of this amount of paste, 0.3975 fills the voids in the sand without affecting the bulk and that the excess at 0.1987 increases the bulk, so that the resulting volume of mortar will be:

Volume of sand	1.0000
Excess of paste	0.1987
Volume of mortar	1.1987 (say 1.20.)

In making the calculations, we have used only two decimals, and have taken 0.60 as the volume of paste for one volume of sand, and 1.20 as the volume of mortar resulting. By simple proportion we find that to make one volume of mortar will require 1.20 : 1 : : 1 : 0.83 volume of sand, and 1.20 : 1 : : 0.60 : 0.50 volumes of paste.

From these values the quantities of sand and cement paste required to produce the volume of mortar in column E were computed. For example: Table 2—broken stone. The volume of mortar required is 3.09 cubic feet, hence the volume of sand required is 3.09x0.83=2.58 cubic feet, and the volume of paste required is 3.09x0.50=1.55 cubic feet.

But the experiment given below Table 1, shows that one volume of cement paste requires 1.33 volumes of dry cement and 0.51 volume of water. Hence 1.55 cubic feet of paste requires 1.55x0.51=0.79 cubic feet of water.

Table No. 3 is constructed from table No. 2, by dividing the several quantities by four, to reduce the results to percentages of a unit of the coarse material.

TABLE NO. 2.

Proportion for Concrete, using Earth-damp Sand, the Materials not Shaken but Loose.

No. Experiment.	Materials	Concrete.			Materials Composing Mortar.				
		Coarse Material Cubic ft.	Voids. Cubic ft.	Mortar Cubic ft.	Sand Cubic ft.	Voids Cubic ft.	Paste. Cubic ft.	Paste, Cubic ft. Dry Cement.	Paste, Cubic ft. Water.
A	B.	C.	D	E.	F.	G	H.	I	J.
1	Broken stone	4.00	2.06	3.09	2.58	1.03	1.55	2.07	0.79
2	Gravel	4.00	1.51	2.26	1.88	.75	1.13	1.50	0.58
3	Wet sand	......	......	......	......	......	......	......	......
4	Stone 5 parts Gravel 3 parts	4.00	1.57	2.35	1.96	0.78	1.17	1.56	0.60
5	Damp sand	......	......	......	4.00	1.59	2.38	3.17	1.21
6	Stone 5 parts Gravel 3 parts Sand 3 parts	4.00	......	......	......	1.29	1.94	2.59	0.99

TABLE NO. 3.

Preceding Table of proportions for Concrete, Reduced to Percentages of one unit of Coarse Materials.

No. Experiment.	Materials.	Concrete.			Material Composing the Mortar				
		Coarse Material.	Voids.	Mortar.	Sand	Voids	Paste.	Cement Paste	
								Dry Cement.	Water
1	Broken stone	1.000	0.515	0.772	0.645	0.257	0.388	0.517	0.198
2	Gravel	1.000	0.377	0.565	0.470	0.167	0.282	0.375	0.145
3	Wet Sand	....	....	....	....	....	....	....	....
4	Stone 5 parts Gravel 3 parts	1.000	0.392	0.587	0.490	0.195	0.296	0.390	0.150
5	Damp sand	....	....	....	1.000	0.397	0.595	0.708	0.302
6	Stone 5 parts Gravel 3 parts Sand 3 parts	1.000	....	....	....	0.322	0.485	0.617	0.217

Table 4 shows the second series of tests made with materials well shaken down and settled in the box. The numbers correspond to parallel tests in the first series.

Tables 5 and 6 show the results deduced from table 4 in the same manner that table 2 and 3 were deduced from table 1; using, however, the result of experiment No. 5 of this series in determining the components of the mortar for the other experiments of the series.

In this case we find that 1 volume of sand and 0.58 volume of paste will make 1.18 volumes of mortar; and that 1 volume of mortar will require 0.85 volume of sand and 0.45 volume of paste.

The volumes of dry cement powder and of water required for one volume of paste being the same as in the first series.

TABLE NO. 4.

Showing Experiments made November 4 and 5, 1878, with materials well shaken down.

No. of Experiment.	Kind of Material.	Quantity of Material—cubic feet.	Small Measure of Water—Number.	Quantity of Water of Voids—cubic feet.	Percentage of Voids.	Remarks.
1	Broken Stone	4.00	7.88	1.97	49.25	
2	Gravel	4.00	5.70	1.425	35.62	
3	Wet Sand	....	....	....	....	Not tried.
4	Stone, 5 parts Gravel, 3 parts	4.00	6.20	1.55	38.75	
5	Sand, earth damp.	4.00	5.68	1.42	35.50	
6	Stone, 5 parts Gravel, 3 parts Sand, 3 parts	4.00	6.20	1.55	38.75	
7	Stone, 6 parts Gravel, 6 parts Sand, 6 parts	4.00	3.88	0.97	21.25	These 18 measures of materials made 14½ measures of the mixture, being a shrinkage of 20 per cent.
8	Stone, 8 parts Gravel, 8 parts	4.00	6.30	1.575	39.37	These 16 measures of materials made 15 measures of the mixture, being a shrinkage of 6.25 per cent.

TABLE NO. 5.

Proportions for concrete, based on second series of experiments; materials well shaken.

No. of Experiment.	Kind of Coarse Material	Concrete.			Material Composing the Mortar.				
		Coarse Material—Cubic feet	Voids—Cubic feet.	Mortar—Cubic feet.	Sand—Cubic feet.	Voids—Cubic feet.	Cement Paste—Cubic feet.	Cement Paste.	
								Dry Cement Cubic feet	Water—Cubic feet
1	Broken Stone	4.00	1.97	2.95	2.51	0.89	1.33	1.77	0.68
2	Gravel	4.00	1.425	2.137	1.816	0.61	0.96	1.28	0.49
3	....	....	....	....	....	....	....	....	....
4	Stone, 5 parts Gravel, 3 parts	4.00	1.55	2.33	1.98	0.70	1.05	1.40	0.51
5	Damp Sand	....	....	....	4.00	1.12	2.13	81	1.09
6	Stone, 5 parts Gravel, 3 parts Sand, 3 parts	4.00	....	....	....	0.92	1.38	1.81	0.70
7	Stone, 5 parts Gravel, 3 parts Sand, 3 parts	4.00	....	....	....	0.97	1.45	93	0.73
8	Stone, 3 parts Gravel, 3 parts	4.00	.575	2.36	2.00	0.71	1.06	1.41	0.54

TABLE NO. 6.

Proportion of Concrete reduced to percentage of One Unit of the Coarse Material.

No. of Experiment.	Kind of Coarse Material.	Concrete.			Material Composing the Mortar.				
		Coarse Material.	Voids.	Mortar.	Sand.	Voids.	Cement Paste.	Cement Paste.	
								Dry Cement.	Water.
1	Broken Stone	1.000	0.492	0.737	0.627	0.222	0.333	0.443	0.170
2	Gravel	1.000	0.356	0.534	0.454	0.160	0.240	0.320	0.122
3	....	....	....	....	....	....	....	....	....
4	Stone, 5 parts Gravel, 3 parts	1.000	0.387	0.582	0.495	0.175	0.262	0.350	0.135
5	Damp Sand	....	....	....	1.000	0.357	0.532	0.710	0.272
6	Stone, 5 parts Gravel, 3 parts Sand, 3 parts	1.000	....	....	....	0.230	0.345	0.460	0.175
7	Stone, 3 parts Gravel, 3 parts Sand, 3 parts	1.000	....	....	....	0.242	0.363	0.484	0.182
8	Stone, 3 parts Gravel, 3 parts	1.000	0.391	0.591	0.500	0.177	0.265	0.352	0.135

Tables No. 7 and 8 contain the ratios of tables 3 and 6 reduced to the nearest even measures and simple fractions of measures, for common use.

TABLE NO. 7.

Showing the Best Proportion of Materials for Concrete, as Derived from the First Series of Experiments on "Unshaken Materials.

Materials	Number of Experiment. 1	2	3	4	5	6
	Parts	Parts	Parts.	Parts.	Parts.	Parts.
Broken Stone	10	....	....	5	....	5
Gravel	....	10	....	3	....	3
Sand	6	5	....	4	4	3
Dry Cement	5	4	....	3	3	6
Water	2	1¼	....	1¼	1⅛	2⅛

TABLE NO. 8.

Showing the Best Proportions of Materials for Concrete, as Derived from the Second Series of Experiments on "Well-shaken" Materials.

Materials.	Number of Experiment. 1	2	3	4	5	6	7	8
	Parts.	Parts.	Parts	Parts.	Parts.	Parts	Parts	Parts
Broken Stone	10	....	....	5	....	5	3	3
Gravel	....	10	....	3	....	3	3	3
Sand	6	4½	....	3⅞	4	3	3	2⅔
Dry Cement	1½	3¾	....	2⅛	2¾	4⅝	3	2⅝
Water	1¾	1¼	....	1	1	1⅛	1½	1

An architect, engineer or builder will notice a marked difference between the results of the two series of experiments. The first series being made with loose materials, the results are not regarded as of practical use, and are given solely as a matter of interest or curiosity. In the second series the voids were reduced to a minimum by the shaking and settling, and the results may be considered a safe guide for the proportions in which materials should be mixed for good concrete.

A comparison of experiments, four and six in each series, and seven and eight in the last, will show that when the sand is mixed with the coarser materials the measurement of voids does not agree with the result obtained from measurement of voids in the coarse materials alone. In experiment No. 6 of first series, and Nos. 6 and 7of second series, the sand was in such quantity as should have just filled the voids, with a slight excess. But in placing the mixed materials in the box the sand did not find its proper place in the voids, but was more or less unequally distributed, so that in some parts the stone would be separated by a thick layer of sand, and in others the voids would be without sand. In No. 7 the utmost care was taken to secure a proper distribution, but the result shows only partial success. Because of this, experiment No. 6, in the first series, and in a less degree, Nos. 6 and 7, in the second, are not regarded as satisfactory. Inasmuch as many formulas for concrete are given by different authorities, which, in the light of these tests, can not result in good concrete, the following able, No. 9, is added to show the least proportions of cement and sand that will just fill the voids. Any proportions less than these will give an imperfect bond between the particles; and with these proportions a perfect bond, while theoretically possible, would not be obtained in practice.

TABLE NO. 9.

Showing the Least Proportion that will Give a Perfect Bond.

Materials.	Numbers of Experiment 1	2	3	4	5	6	7	8
Broken Stone	4	......	......	5	......	......	......	3
Gravel	......	5	......	3	......	......	......	3
Sand	2	1¼	......	3	2	......	......	2½
Dry Cement	1	¾	......	1½	1	......	......	1¼
Water	⅓	⅓	......	½	⅓	......	......	⅓

In cases where it is desirable to cheapen the cost, the proportion of mortar may be reduced below that given in tables Nos. 6 and 8 without seriously impairing the strength, provided ther ichness of the mortar is kept up to the standard.

TABLE NO. 10.

Crushing Strength, in Pounds per Square Inch, of Cement Mortar Ninety Days Old, the Last Eighty-nine in Water, from a Paper by D. J. Whittemore, Civil Engineer of C. M. & St. P. R. R.

Kind of Cement	Composition of Mortar. Clear Cement.	3 to 1	1 to 1	1 to 2	1 to 3
Commercial No. 1	2,775	1,930	884	299	128
Commercial No 2	2,290	1,614	794	337	180
Commercial No. 3	2,058	1,664	1,071	417	233
Commercial No. 4	3,302	2,767	1,536	812	521
Commercial No. 5	2,981	2,150	939	742	472
Commercial No. 6	3,479	3,060	1,590	866	615
Commercial No. 7	4,742	3,475	1,737	843	625
Commercial No. 8	2,767	2,396	1,596	1,008	671
Commercial No. 8	3,7-9	3,156	1,900	955	580
Commercial No. 10	3,217	2,981	2,075	1,208	756
English Portland	5,390	3,648	3,356	1,779	792

He adds: "Practically, cement is seldom used in greater quantities than with equal parts of sand. Very frequently it is used in the proportions of one to two or three of sand where great strength is not required." It will be observed that the maximum of strength results from the use of "clear cement," and the addition of each equivalent of sand reduces the strength of the previous proportion from twenty to forty per cent. The uniformity of results shows that one cement can carry little or no more sand than its rivals.

TABLE NO. 11.

Showing Results of Different Kinds of Materials, with One to Two Parts of Mortar and Mortars of Different Composition. [General Gilmore, Vol. 252; Breaking Load of Prisms Six Inches Square, and Thirty-one and a Half Inches Between Supports.]

Coarse Materials.	Composition of the Mortars. Neat Cement.	Cement 1.00 Sand .50	Cement 1.00 Sand .50 Lime .25	Cement 1.00 Sand 1.00	Cement 1.00 Sand 1.00 Lime .25	Cement 1.00 Sand 1.50	Cement 1.00 Sand 1.50 Lime .25	Cement 1.00 Sand 2.00	Cement 1.00 Sand 2.00 Lime .25
Granite fragments with one measure of mortar	1,973	1,142	2,778	3,900	2,721	2,015	2,056	......	1,574
Granite fragments with two measures of mortar	1,068	4,983	5,064	4,088	5,366	1,547	3,537	1,643	1,972
Brick fragments with one measure of mortar	3,212	2,117	......	4,127	3,254	1,788	2,136	1,867	3,649
Brick fragments with two measures of mortar	2,906	5,047	2,966	4,232	1,178	3,635	3,856	2,329	4,003
Stone gravel with one measure of mortar	1,097	1,040	1,240	1,256	1,066	......	......	......	......
Stone gravel with 2 measure mortar	2,347	4,247	2,655	1,293	3,351	......	......	......	......
Stone fragments, grouted	3,278	1,847	2,012	1,158	1,178	......	......	......	

Respectfully submitted,
John Collett.
Thomas H. Johnson.

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On Egyptian sculptures dating from upward of 1500 years B. C, there are rough figures of a kind of bellows for the forging of tools, the inflation of air being accomplished by working cords with the hands.

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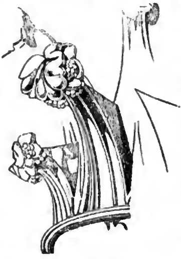
The Mt. Waldo Granite Company, at Frankfort, Me., is giving employment to ninety cutters, and the force will be added to as soon as the quarry is in condition.

SCULPTURE BY ACIDS.



CROCKET.

THERE are secrets in every art, springing from the reflections of men of genius and often from chance, which render easy the execution of works which would necessitate an exceedingly tedious amount of manual labor, without the certainty of accomplishing its end; such are the fillets, the chords, and the rows of glittering beads which are imprinted on metals with a simple mullar, the guilloches which almost form themselves by the perfection of the tools which are used, as well as the beautiful carving upon softened ivory and expanded shell, and the admirable designs upon paper hangings.

The sculpture of marble without mallet, chisel, or burin, is still more wonderful, and not less easy of execution; for this it is only necessary to know how to utilize acids.

Tables and chimney-pieces of white marble are sometimes seen decorated with very delicate sculptures, which seem to require immense labor, and for which it seems impossible that chisels or other ordinary instruments, however delicate, could have been used. The workmen, jealous of their secrets, conceal them in order to increase the price of their work, by causing it to be supposed that much time and pains were necessary to execute these beautiful masterpieces, whereas they were made with the greatest facility.

M. Dufay, having perceived that these works were too delicate to have been made with tools, soon discovered that they had recourse to acids, but experiments were necessary to specify them. Many acids caused the marble to turn yellow, and were, therefore, inapplicable.

He also experimented upon several varnishes, until he discovered one which was easy to use, which dried readily, and was impenetrable to acids. Such is the course which one is always obliged to follow in the arts, in the simplest researches. The following is his process:

Prepare a varnish by simply pulverizing Spanish sealing-wax, and dissolving it in spirits of wine.

Trace on the white marble, with a crayon, the design which is to be formed in relief, and cover this delicately with a brush dipped in the varnish; in less than two hours the varnish will be perfectly dry. Prepare a dissolvent formed of equal parts of spirits of wine, spirits of salt, (hydrochloric acid,) and distilled vinegar; pour this solution upon the marble, and it will dissolve those parts which are not covered by the varnish. When the acid has ceased to ferment, and consequently, will no longer dissolve the marble, pour it on anew, which continue until the ground is sufficiently grooved.

It should be observed that, when there are delicate lines in the design which should not be grooved so deeply, they should at first be covered with varnish, to prevent the action of the acids upon them, then, when the reliefs have been made, the marble should be well washed, and the varnish removed from these delicate lines with the point of a pin; then pour on new acid, which will groove it as deeply as desired care being taken to remove it at the proper time.

It is necessary to observe that when the acid has acted upon the marble, it corrodes beneath the varnish, and enlarges the lines in proportion to its depth; care should therefore be taken to draw the lines in relief a little larger than it is desirable to leave them.

When the work is completed, remove the varnish with spirits of wine, and, as the grounds will be very difficult to polish, they may be dotted with ordinary colors diluted with the varnish of gum lac. By coloring these grounds, or the reliefs which have been thus engraved, a beautiful effect will be produced, and one which, if the secret of this art should ever be lost, would cause them to be regarded in future ages as *chefs-d'œuvre*.—*French Translation.*

CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT.	STRUCTURE.	COST.
Decatur, Ala.	Decatur Mineral & Land Co.		Two-story block.	
Decatur, Ala.	New York parties.	I. M. West & Sons.	Block.	$14,000.
Fort Smith, Ark.	Anheuser-Busch Brewing Co.	M. M. Brennan.	Business block.	$10,000.
Jonesboro, Ark.		A. L. Malone.	Hotel	$20,000.
Little Rock, Ark.	J. M. Moore.		Brick residence.	$12,000.
Little Rock, Ark.	Dr. Southall.		Brick residence.	$8,000.
Little Rock, Ark.	L. B. Leigh.		Brick residence.	$7,000.
Little Rock, Ark.	Mr. Drufies.		Brick residence.	$5,000.
Little Rock, Ark.	W. Turner.		Two-story block.	
Lonoke, Ark.	Lonoke Hotel Co.		Two-story hotel.	$7,000.
Macon, Ga.	W. B. Sparks H. Horne		Hotel.	$100,000.
Macon, Ga.	Mulberry-st. Church.		Church.	
Rome, Ga.	A. B. Hill.		Residence.	$10,000.
Frankfort, Ky.	State of Kentucky.		Add to Penitentiary.	
Frankfort, Ky.	Mason-Foard Co.		Office building.	
Louisville, Ky.	The Louisville Legion.		Armory.	
Baltimore, Md.	The First National Bank.		Bank building.	
Baltimore, Md.	The Catholics.		Church.	
Baltimore, Md.	T. H. Blick.		18 two-story bricks.	
Baltimore, Md.	S. D. Price.		11 three-storybricks.	
Baltimore, Md.	A. F. Foster.		6 two-story build'gs.	
Baltimore, Md.	House of Good Shepherd.		Three-story brick.	
Washington, D. C.	Smith & Marr.		19-residences.	$75,000.
Washington, D. C.	W. H. Wetzell.		2 houses.	$6,000.
Washington, D. C.	O. G. Wales.		Dwelling	$10,000.
Washington, D. C.	A. C. Smith.		2 brick dwellings.	$9,000.
Washington, D. C.	J. J. Shedd.		Brick building.	$17,500.
Washington, D. C.	Mrs. S. P. Okie.		Brick dwelling.	$12,000.
Washington, D. C.	Geo. E. Emmons.		9 brick dwellings.	$8,800.
Washington, D. C.	J. W. Little.		Brick residence.	$8,000.
Washington, D. C.	R. E. Sinclair.		2 brick dwellings.	$6,000.
Washington, D. C.	E. Woltz.		4 brick residences.	$8,000.
Washington, D. C.	A. K. Brown.		Brick store build'g.	$8,000.
Washington, D. C.	H. E. Pellen.		2 brick residences.	$15,000.
Washington, D. C.	A. Fisherman.		Brick residence.	$10,000.
Washington, D. C.	N. W. and C. Berger.		Brick building.	$10,000.
Ballinger, Tex.	Runnells County.	County Commissioners.	Courthouse.	
Alderson, W. Va.	Alleghany Collegiate Institute.	Frank Follansbee.	College buildings.	$8,000.
Montgomery, Ala	The Standard Club.	D Abraham, Sec'y.	Four-story brick.	$30,000.
Muskegon, Mich.	Board of Education.	Chas. H Hackly.	Public Library.	50,000
Mt. Vernon, N. Y.	Y. M. C. A.	Chas. E. Miller.		30,000
Rochester, N. Y.	A. W. Wadge.	Richardson & Co.	Stores and flats.	20,000
Bessemer, Ala.	Wm. Berney.		Stores and opera h.	
Bessemer, Ala	B. Roden		Residence.	30,000
Mobile, Ala.	County Board.	P. Williams, Jr.	Court house.	
Montgomery, Ala.	—— Moses.	Montgomery Real Estate Co.	Business block.	100,000
Hutchinson, Kan.	J. Lawrence Smith.		Business block.	
Springfield, Mo.	L. H. Murray.		Business block.	
Lawrence, Mass.	M. D E. Steere.	Geo. G. Adams.	Residence	25,000
Winchester, Mass.	S. B. White.	Geo. G. Adams.	Business block.	20,000
St Louis, Mo.	Thos. J Prosser.	Legg Architectural Co.	Residence.	25,000
New Haven, Conn.	J. G. Smith.	R. G. Russell.	Residence.	10,000
Buffalo, N. Y.		Wm. L. Marcy.	Stores and flats.	60,000
Chicago, Ill.	Germania Club.	Addison & Fiedler.	Club house	100,000
Chicago, Ill.	Trinity M E. Church.	L. B Dixon.	Parsonage.	15,000
Chicago, Ill.		W. L. Carroll.	Stores and flats.	15,000
Chicago, Ill.	Henry Rumsfield	F. Foehringer.	Stores and flats.	40,000
Chicago, Ill.	T. B. Owing.	Cobb & Frost.	Stores and offices	400,000
Gainesville, Ga.	The City.	The Mayor.	Water works.	
La Grange, Ga.	The City.	The Mayor.	Water works.	
Burlington, Ky.	The County.	McDonald Bros , Louisville.	Court house.	
Washington. D. C.	John E. Beall.		6 brick residences.	15,000
Dallas, Tex.	County Commissioners.		Bridges.	
Albany, N. Y.	The City.	City Engineer Andrews.	Granite pavement.	
Norfolk, Nebr.	The City.	Geo. H. Lattimer.	Paving.	
Denver, Colo	Denver, Sm. & Ref. Co	Franz. Cazin, M. E.	Smelter.	
Toledo, O	The City.	City Clerk.	Granite pavement.	
Jackson, Miss.	Ill. Central R R	E. T. Jeffery, mgr.	Depot.	24,000
New York, N. Y.		J. C. Prague.	Flats.	165,000
New York, N. Y.			Residences.	400,000
Brooklyn, N. Y.	Smith & Gray	P. J. Lauritzen, N. Y.	Store and office bldg.	80,000
New York, N. Y.	Lawrence Kelley.	C. A. French & Co.	Store and office bldg.	60,000
Brooklyn, N. Y.	Levy Bros & Dahlman	J. G. Glover.	Business building.	18,000
Chicago, Ill.	Malcom McKay.	W. L. Carroll.	Flats.	15,000
Wilmington, N. C.	Wilmington Light Infantry.		Armory.	20,000
Marshall, Tex.	County.	Tozer & McQuoik, Dallas.	Court house.	
Texarkana, Tex.	I. & P. R. R. & St. L. I. M. S. R. R.		Union depot.	
Atlanta, Ga	Odd Fellows.		Temple.	
Charleston, W. V.	J. Becker & Co.		Opera house.	30,000
St. Paul, Minn.	St. Peter's P. E. Church	Rev. Samuel Mills.	Church.	9,000
Kansas City, Mo.	James Cotter.	A. B. Cross.	Business block.	
Kansas City, Mo.		Chas. Marcotte.	Business block.	100,000

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT.	STRUCTURE.	COST.
Chicago, Ill.	State Normal School.	Jenney & Otis.	School-house.	120,000.
Chicago, Ill.	J. P. Dodge.	C M. Palmer.	Residence.	15,000.
Chicago, Ill.	Potter Palmer.	C. M. Palmer.	4 dwellings.	200,000.
Chicago, Ill.	Dr. Guerin.	J. J Eagan.	2 three-story houses.	20,000.
Chicago,	F. P. Owings.	H B. Seeley.	Seven-story store.	700,000.
Chicago.	The Mannerchor Society.		Block.	25,000
Chicago.	Oscar F. Mayer & Bros.	Addison & Fiedler.	Three-story brick.	10,000.
Toledo, O.	The City.	C. A. Dresser, Chairman Committee.	Public library.	$40,000.
Wabash, Ind.	Wm. Hazen, Auditor.		Orphans' Home.	
Milwaukee, Wis.	D. C. Green.		Masonic Temple.	
Rawlins, Wyo.	Jas. P. Wallace.		Penitentiary.	$100,000.
Columbia City, Ind.		G. W. Lloyd.	Two-story brick.	20,000.
Detroit, Mich.	Trangott Schmidt.	A. C. Varney.	6 three-story brick.	10,000.
Detroit, Mich.	Allen Bros.	E. W. Arnold.	12 three-story brick.	20,000.
Albany, N. Y.	Addison White.		Residence.	
Findlay, O.	Dr. A. L. Davis.	Geo. Horn.	Brick & stone res.	$25,000.
Detroit, Lich.	C. C. Blodgett.	A. H. Ramsden.	Stone residence.	60,000.
Kansas City, Mo.		A. H. Ramsden.	Building.	40,000.
Kansas City, Mo.		C. B. Lakin.	Hotel.	30,000.
Kansas City, Mo.	A. G. Berlinder.	Knox & Guinotte.	Three-story bank.	15,000.
Cincinnati, O.	First German Reformed Church.	B. M. Bande.	Church.	
Cleveland, O.	Mrs. G. Haltnorth.	Wing & Mahurin.	Four-story brick.	12,000.
Springfield, Mass.	Jas. W. Woodrich.		Three-story brick.	
South Bend, Ind.	Studebaker Bros.		Business block.	
Baltimore, Md.			Church.	
San Francisco, Cal.	Academy of Science.		Academy.	200,000.
Pittsburgh, Penn.	O'Neil & Rook.	C. H. Chance.	12 two-story houses.	36,000.
Pittsburgh, Penn.	C. Schlegel.	J. Tilburgh.	Four-story brick.	13,000.
Pittsburgh, Penn.	T. P. Hershberger.	J. P. Bailey	Three story brick.	10,000.
Milwaukee, Wis.	Immanuel Church.		Church.	50,000.
Minneapolis, Minn.	Globe Printing Co.		Eight-story house.	175,000.
Aberdeen, Dak.		Jewett.	Two-story brick.	
Gardner, Mass.	Haywood Merrill Rattan Co.	Fuller & Delano.	Building.	$100,000
Peoria, Ill.	American Glucose Co.	F. Hasbrouck.	Five-story brick.	$83,000.
Fremont, O.	St. Ann's church.	W. H. Shively.	Church.	
Boston, Mass.	S. V. White	T. R. White.	7 four-story houses.	
Chicago.		E. E Snyder.	Three-story house.	12,000
Findlay, O.	Lemuel McManness.	Architect Kennedy.	Brick & stone res.	$10,000.
Findlay, O.	Wm. Kramer.	D. T. Davis.	Brick business block	
Kansas City, No.	Commercial Bank.	Vrydah & Shepard.	Building.	225,000
Kansas City, Mo.		W. W. Polk.	Office building.	500,000.
Chicago, Ill.	Wm. Jones.	L. G. Hallberg.	Residence	$10,000.
Chicago.	Freeman Campbell.		5 two-story blocks.	15,000.
Chicago.	Geo A. Seaverns.		2 two-story houses.	15,000.
Milwaukee, Wis.	First Baptist society.	Geo. W. Peck.	Church.	$50,000
Baltimore, Md.	Catholics.	Chas. F. Mayer and Wm. Keyser Com.	Church.	$40,000.
Minneapolis, Minn.	Park Ave. Congregational Church.	Rev. D. Woodbury.	Church.	$45,000.
Chicago.	B. F. Felix.		Three-story house.	20,000.
Chicago.	H. R. Wilson.		6 three-story houses	40,000.
Chicago.	Scott & Henry.		2 three story b'ocks.	19,000.
Chicago.	H. Abrahams.		2 three-story blocks.	15,000.
Elgin, Ill.	First Congregational church society.		Church.	$30,000.
Sedalia, Mo.	Methodists.		Stone church.	$24,000.
Chicago.	Dr. Brooks.	Bemen & Parmentier.	Residence.	50,000.
Chicago.	Illinois Training School for Nurses.		Add School-house.	16,000.
Chicago.	C. C. Keominger.		Three-story block.	10,000.
Topeka, Kans.	T. Dwight Thachers.	L. D. Eversale.	Stone residence.	
Nebraska City, Neb.	Anheuser Busch Brewing Co.		Brick business block	$100,000.
Duluth, Minn.	Palladio Office Building Co.		Office building.	
New Haven, Conn.	W. C. Robinson.	Architect Stillson	Brick & stone res.	
Chicago.	H. Abrahams.		2 three-story flats.	10,000.
Chicago.	F. Mehan.		2 four-story blocks.	15,000.
Chicago.	Th s. Leonard.		2 three-story blocks	51,000.
Worcester, Mass.		A. P. Cutting.	High school.	$35,000.
Buffalo, N. Y.		C. K. Porter & Son.	School-house.	$45,000.
Chicago, Ill.		W. A. Arnold.	Two school-houses.	$16,000.
Chicago, Ill.		Jul. Speier.	Three-story hotel.	$20,000.
Savannah, Ga.	Savannah Hotel Association.	H. M. Comer, Chairman Com.	Five-story hotel.	
Bloomington, Ill.	J. Press Butler.	Geo. H. Miller.	Four-story hotel.	
Los Angeles, Cal.	Dr. Burbank.	J. W. Wood.	Opera-house.	$150,000.
Cambridge, Mass.		Longfellow; Alden & Harlow.	City hall	$200,000.
Wichita, Kans.		W. R. McPherson.	Court house.	$150,000.
Zanesville, O.		H. C. Lindsay.	Town hall.	$10,000.
Charleston, S. C.	Y. M. C. A.	N. B. Williams.	Y. M. C. A. building.	$40,000.
Denver, Colo.	Masons.		Six-story temple	$200,000.
Chicago, Ill.	A. D. Ellis.	Ostling Bros.	Three-story block.	$30,000.
Chicago, Ill.	C. W. Fallgern.	Ostling Bros.	Two-story dwelling.	$5,500.
Chicago, Ill.		Ostling Bros.	Four-story building.	$18,000.
Chicago, Ill.		Ostling Bros.	Two-story building.	$4,500.
Chicago, Ill.		Ostling Bros.	Four-story building.	$12,000.
Buffalo N. Y	St. Stephen's parish.	F. W. Humble.	Stone church.	$50,000.
Chicago, Ill.	Burley & Co.	Burnham & Root.	Store.	60,000.
Chicago, Ill.	William Waller.	E. Baumann.	Four-story flat	20,000.
Chicago, Ill.	J. E. Woodruff.	L. Martins.	Nine stores.	65,000.
Anniston, Ala.	Episcopal church.	J. W. Noble.	Church.	$60,000.
New Bedford, Mass.	Congregationalists.	C. Hammond.	Church.	
Worcester, Mass.	Jewish Sons of Abraham.	Wm. H. Harvey.	Brick synagogue.	$8,000.
North Adams, Mass.		F. W. Merriam.	School-house.	

PRICE CURRENT.

ARTIFICIAL STONE.

(C A Stevens, Lansing, Mich.)

	Sq ft
Sidewalks	12½c
Building stone, plain	20 c

BLUE STONE.

New York	4½c
Wyoming Valley	

[Forest City Stone Co., Cleveland, O.,]
(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches,	20
	Sup ft.
Flagging, 4 to 6 inches thick, any size up to 12 ft long	12c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscous blocks	40
No. 2. " "	30c
No 1. Monument Bases, broken to size	45c
No. 2. " " " "	35
Engine beds, broken to size,	40
Perch or Wall Stone, per ton railroad weight	50c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	60

BROWN STONE

[All quotations f. o. b. quarry, unless otherwise mentioned.]

	Cu. ft.		
Carbondale, light	70c.	f. o. b.	quarry
" dark	95	"	"
Hummelstown	45	"	"
Lake Superior	100	"	Chicago
Trenton	50		
Ohio	35		
Linden	80		

OHIO BROWNSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	60c
No. 2. " "	50

Stone ordered to dimension sizes 10 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT—
(Middlesex Quarry Co., Portland)

	Cu ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft and over, price to be agreed upon	
	Superficial
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft long, promiscuous sizes	63
Platforms, Cornice, etc., 7 to 8 in. thick, under 18 superficial feet	85
Platform, Cornice, etc., 18 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	1 12
" " etc., 32 superficial feet and over price to be agreed upon	
Area Ashlar, under 4 in thick	20
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 8 in. promiscuous lengths	63
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu. ft.	1 50
" " 20 cu. ft. and over, price to be agreed upon	
Monumental Stone, 8 to 12 in. thick, charged 12 in.	
Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in. thick	58

Discount 5 per cent.; cash or approved Notes, at two months.

(Chas. W. Stearns, Cleveland, O.)

Brown stone 75c f. o. b. quarry.

FREESTONE.

New Brunswick brown	.45c
Buena Vista	.40
Ohio	.30
Long meadow	.60

GRANITE.

Westerly	
Monson	
Woodstock	.50c
Mica Stone	.50
Port Deposit	.40

GREEN STONE.

Pennsylvania	50c

LIME, CEMENT, ETC.

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f.o.b. Erie.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	50
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers per bushel	30
" " limed, " 1 " " " "	35
Fire brick Savage per 100	5 00
" " Aetna " "	4 00
" " Montezuma " "	3 50
" " West Virginia " "	3 00
Ground fire clay, best, per bushel	1 00
" " " common " "	75

Discounts

Vitrified sewer pipe,	60 per cent.
Flue Pipe for Chimneys	25 " "
Terra Cotta Chimney Tops	25

LIMESTONE.

	Cu ft.		
Salem, Bedford	25c	f. o. b	quarry.
Oolitic, " buff	25	"	"
" " blue	35	"	"
Oolitic Bowling Green	25	"	"
Artesian	35	"	"
Grafton	35	"	"

MAGNESIAN—
(J. A. Green, Stone City Iowa.)

Dimension Stone—(First Quality of all ordinary sizes.)	
12 inches and over, per cubic foot	$ 35
11 to 12 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17
Vault covers—(Large size.)	
7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25
Flagging Stone—(Ordinary size.)	
5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10
Bridge Stone.	
Common, per cubic yard	$ 2 50
Coppings, " " "	6 75
Pedestal Bases, per cubic yard	6 75
Footing Stone.	
Dimensions, per cubic yard	$ 3 25
Common, " " "	2 50
Rubble or Building Stone.	
Common Rubble, Per 100 lbs	2½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	8
Street Crossings.	
5 to 6 inches, per superficial foot	$ 15
Curbing, 5 to 6 inches thick, per superfiical ft.	15
Cut and Rubbed Stone—(Finished Ready to lay in their place.)	
Ashlars per sq. ft. measuring all that shows	$ 60
Base	70
Corner Blocks	
Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

8 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

JOLIET Rubble, $4 cord; dimension 30c

ELLETTSVILLE—
(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—
(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—
(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts, per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts extra per superficial foot.

Rough Stone.

Mill Blocks as quarried, per cu ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft	15c
Promiscuous good select Bridge Stone, cu ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 3 per ct., on rough and dimension, and 5 per ct. on sawed.

(H. Dearborn & Son, Stone City, Iowa.)

Dimension Stone Drilled to Given Size.

	Per Lineal Foot, f. o. b.
Water Table, 11 and 12 inches thick	35c
" 9 " 10 " "	30
" 7 " 8 " "	28
" 6 " "	25
Belt Course, 5 to 7 inches thick	25
Window Caps and Sills	25

Dimension Stone in Large Pieces.

12 inches thick and over, per cubic foot f. o. b.	35c
11 and 12 inches, per superficial foot f.o. b.	30
9 " 10 " " " "	27
7 " 7 " " " "	25
6 " " " "	20
5 " " " "	17
4 " " " "	12
3 " " " "	10
Rough Flags, promiscuous sizes, all shapes, per carload	25 00

Ashlar all Lengths.

11 and 12 inches thick, lineal	$ 25
9 " 10 " " "	20
7 " 8 " " "	17
Bridge Stone, per cubic yard	2 50
Footing " " " "	2 25
Dimension Footings per foot	15
Bridge Coping and Pedestal, per cubic foot,	25
Street Crossings and Curbs, per superficial foot	20
Block Rubble drilled, per 100 lbs	8 Cents
Heavy Block Rubble, per 100 lbs	4 Cents
Select Rubble, per 100 lbs.	3½ Cents
Common Rubble, per 100 lbs	2½ Cents
Riprap, per carload	1 50

Flagging Cut Ready to Lay Down.

7 and 8 inches thick, per superficial foot	35c
6 " " " " "	30
5 " " " " "	22
4 " " " " "	17
3 " " " " "	14

Cut Stone.

Window Caps and Sills, per lineal foot	$ 30
Window Caps and Sills, over one foot wide, per superficial foot	50
Water Table, 11 and 12 inches, per lineal foot	1 00
" " 9 " 10 " " " "	75
" " 7 " 8 " " " "	60
Door sills, platforms and steps, per superficial foot	60
Frieze Course, per superficial foot	60
Ashlar, per superficial foot	50
Corner Blocks, plain, per superficial foot	75
" " rustic " " "	85
Bases, per superficial foot	70
Circular and Segment Caps, outside measure, per lineal foot	75
Circular and Segment Caps, beveled and scotia, per lineal foot	1 00

[Big 4 Limestone Co., New Point, Ind.]

Prices on cars at quarry, the buyer paying freights.

Flagging for Sidewalks.

	In Rough.	Jointed.	Jointed and 4 cut Hammered.
3-inch	10c	13c	20c
4 "	16c	21c	26c
5 "	17c	22c	27c
6 "	18c	24c	30c
7 "	22c	28c	34c
8 "	24c	30c	36c
9 "	26c	33c	39c
10 "	28c	36c	42c
11 "	30c	38c	44c
12 "	32c	40c	45c

2c extra when over 14 feet long or in strips less than 2 feet broad.

Platforms	In Rough	6-cut Face. 8-cut Edges.	8-cut Face. 10-cut Edges.
6-inch	22c	56c	65c
7 "	24c	56c	65c
8 "	28c	58c	65c
9 "	30c	58c	65c

Block Stone.	Cu. ft.
12 inches thick or over	—
Irregular sizes, 20x70 ft	30c
Special sizes	35c
Bases	33c

Block stone less the 12 in. thick at Flagging Prices.

Bridge Stone.	Ton of 2,000 lbs.
First-class, dressed	$2 25
" undressed	1 80
Second-class	1 00
Coping, 12 in. thick and over	2 15
" less than 12 in. thick at flagging prices.	

Building stone.	Ton of 2,000 lbs.
Riprap	$0 25
Ordinary Rubble.	50
Range Rubble (select)	1 00
Scrap Flagging	1 50

Range stone 6 to 10 in. thick, 6 to 10 in. wide, 15c lin. ft.

Jail Stone.	6-cut Hammered.
6-inch, one side dressed	34c
both sides dressed	46c
7-inch, one side dressed	38c
both sides dressed	50c
8-inch, one side dressed	42c
both sides dressed	54c
9-inche, one side dressed	46c
both sides dressed	58c

Door Sills and Steps.

6-inch, per sup. foot, in rough..........Sq. ft. 20c
7 " " " " .... " 25c
8 " " " " .... " 30c
Ordinary dress, 6-cut edge, 4 cut face..........Sup. ft. 50c
Extra dress, 8-cut edge, 6 cut face.......... " 55c
" 10 " 8 " .... " 65c
Sawed sills of all kinds per sup. foot..........
Strips less than 12 inches wide same price per lineal foot as Sills and Steps are per superficial foot.

Culvert Covering and Footings
Same price as Footings.
Irregular sizes, ...8 to 9 in. thick, 11c 10 to 12 in. 12c
Dimension " ......8 to 9 in. thick, 13c 10 to 12 in. 14c

Crushed Stone.
In orders for 25 cars and over.......... 35c per ton.
" of less than 25 cars .... 40c "

Invert Stone for Sewers.
9x30 in.x2 ft radius..........35c lineal foot.
9x30 in.x3 ft. " ....90c "

Pier Stone.
Stone in rough, 25c per cubic foot.
The thickness optional with consignor.
If dressed, add to price of stone in rough for bedding and pitching face, 18c per cubic foot. For bedding and tooth axing face, 25c per foot face measure

KASOTA PINK OR WHITE—
(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure..........35c
9 " " superficial " 30
8 " " " " 28
7 " " " " 26
6 " " " " 25
5 " " " " 20
4 " " " " 15
3 " " " " 13

Lineal measure.
Stone 9x10.......... 25
Stone 9x8.......... 24
Stone 9x7.......... 22
Stone 9x6.......... 21
Stone 9x5.......... 19
Stone 8x8.......... 22
Stone 8x7.......... 21
Stone 8x6.......... 20
Stone 8x5.......... 18
Stone 7x7.......... 20
Stone 7x6.......... 19
Stone 7x5.......... 17
Stone 6x6.......... 17
Stone 6x5.......... 17
Range Stone 12 inches thick.......... 22
" " 10 " " 18
" " 9 " " 16
" " 8 " " 14
" " 7 " " 13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.
10 to 12 inches thick superficial measure.......... 12½
7 to 9 " " " " 10
The above drilled to size one way only.

Dimension Footing
10 to 12 inches thick superficial measure.......... 15
7 to 9 " " " " 12
Drilled to size both ways.

Bridge Stone.
$3 to $4.50..........per cubic yard.

Rip Rap.
$1 to $2 50..........per car load.

MARBLE.

TRUE BLUE MARBLE—
(True Blue Marble Co., West Rutland, Vt.)

1888.	Superficial in. ¾	1	1¼	1½	2	3	4	Monumental.
Dark Veined Blue	25	30	35	40	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	55	55	82	1 10	4 00
Ex. Dk. Veined Blue	35	40	50	60	60	90	1 20	4 50
Ex. Dk. Mottled Blue	40	45	55	70	70	1 05	1 40	5 00

Dark blue base strips and posts, per cubic foot..........$1 75
Dark blue bottom bases.......... per cubic foot.......... 1 75
Dark blue bottom bases defective, per cubic foot.......... 1 25
Dark blue markers, 0 10 to 1.2 long, 4 in. thick each.......... 50
Dark blue markers, 0 10 to 1,2 long, 4 in. thick, each.......... 75
Dark blue foot stones, 5 to 8 in. wide, assorted sizes each. 20
Dark blue foot stones, same sizes, sawed heads, each.......... 22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each.......... 25
Diminished dies, extra.......... cubic foot.......... 50
Strips ordered 7 ft long and over, extra per cubic foot.......... 50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton..........10 00
Sand rubbing.......... per cubic foot. 35
Boxing.......... " " 25

(Toledo Marble Co., Toledo, O.)

RUTLAND MARBLE

1888	Superficial 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental
Statuary	81	1 10	Same as 2 inch	1 12	1 32	2 84	8 00
No. 1	78	91		1 17	1 77	3 16	6 00
Average	61	74		85	1 22	1 64	5 65
No. 2	44	47		68	98	1 21	4 65
Rutland Italian	63	32		65	92	1 24	4 65
Mottled Smith				47	70	94	[illegible]
Best No. 3	40	41		42	62	84	[illegible]
No. 3	31	32		33	47	61	2 40
Extra dark and mottled blue	44	44		67	1 00	1 34	3 90
Dark blue	31	39		57	86	1 14	3 90
Light blue	20	20		32	51	71	2 90

Hearths, 1 in., sawed edges, per sup. foot..........$ 24
No. 3 Base strips and posts, cubic foot.......... 1 90
Inferior No. 3 posts and strips " 1 65
" No. 3 bottom bases " 1 65
" No. blue posts, strips and bottom bases.......... 2 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.......... 70
" " " 4 " 1 00
Footstones, 5 to 8 in., each.......... 30
" sawed heads, each.......... 32
" " sand rub and box.......... 38

SUTHERLAND FALLS MARBLE—

1888	Superficial 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental.
Mourning veins	53	66	87	92	1 36	1 84	5 40
No. 1	48	59	82	87	1 30	1 74	4 90
Average	38	49	62	67	1 00	1 34	3 90
No 2	28	34	42	47	70	94	3 15
Best No. 3	23	29	35	37	55	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Strips and Posts, per cubic ft..........$1 90
Inferior No. 3, Posts and Strips, per cubic foot.......... 1 65
Inferior No. 3 Bottom Bases.......... 1 65
Markers 12 to 14 in. long, 3 inches thick each.......... 50
do 12 to 14 " " 4 " " " 70
do 16 to 18 " " 3 " " " 1 00
do 16 to 18 " " 4 " " " 1 30
Footstones, 5 to 8 inches wide, 2 inches thick each.......... 30
Footstones, sawed heads, each.......... 32
Footstones, sawed heads, sand rub, and box, each.......... 38
Hearths, 1 inch, sawed edges, per sup. ft.......... 24

MOUNTAIN DARK MARBLE—

1888	Superficial. ¾ in.	1¼ in.	2 in.	3 in.	4 in.	Cu. Monumental.
No. 1	[illegible]	74	1 07	1 60	2 14	5 90
Average	43	64	87	1 30	1 74	4 90
No. 2	31	49	67	1 00	1 34	3 90
No. 3	25	34	52	78	1 04	3 10

Inferior No. 3, Bottom Bases, per cu. ft..........$2 15
Inferior No. 3, Strips and Posts, per cu. ft.......... 2 15
Markers, 10 to 14 inches long, 3 inches thick, each.......... 50
do 10 to 14 " " 4 " " " 70
do 16 to 18 " " 3 " " " 1 00
do 16 to 18 " " 4 " " " 1 30

URN LIST—
In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in inches.	Diam. Bowl in Inches	Rutland Average S. F. D. M. V. Mount Dk. No. 1	R'l'd No. 2 ex. dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled & Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No. 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	3 40
8	5	2 95	2 85	2 75	2 65	2 55	3 65
9	5	3 15	3 05	2 95	2 85	2 75	3 75
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 90	3 60	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	3 90	3 70	5 50
14	6	4 80	4 50	4 20	4 00	3 80	5 70
15	7	5 15	4 85	4 55	4 35	4 15	5 75
12	7	5 35	5 05	4 75	4 55	4 75	6 25
11	7	5 65	5 25	4 95	4 65	4 45	6 50
13	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 60	6 20	5 80	5 60	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 00	7 40	6 90	6 40	6 00	8 10
16	9	8 50	8 10	7 50	7 00	6 60	9 50
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 50	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 50
18	10	11 35	10 35	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 25	14 25
24	10	13 75	12 45	11 35	10 35	9 55	15 75
18	11	13 75	12 55	11 65	10 65	9 90	15 85
20	11	14 85	13 25	12 15	11 15	10 35	15 85
22	11	15 85	14 05	12 75	11 65	10 85	16 85
24	11	16 25	14 65	13 35	12 15	11 25	17 85
18	12	15 85	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 85	17 95
22	12	17 75	16 05	14 65	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 35	13 15	.....
28	12	20 65	18 45	16 55	14 95	13 65	.....
24	13	21 20	19 00	17 10	15 50	14 20	.....
26	13	22 50	20 10	18 00	16 20	14 80	.....
28	13	23 80	21 20	19 00	17 10	15 60	.....
30	13	25 00	22 40	19 90	17 90	16 30	.....
24	14	25 90	23 20	21 00	19 10	17 00	.....
26	14	27 40	24 70	22 30	20 30	18 70	.....
28	14	29 20	26 20	23 60	21 40	19 70	.....
30	14	30 90	27 70	24 90	22 50	20 70	.....
32	14	32 70	29 20	26 20	23 70	21 80	.....

POLISHING MATERIALS—
California Putty.......... per lb. $1 00
Putty, extra fine quality.......... " 90
" " " " 12½ lb. boxes.......... " 70
Scotch Hone.......... " 15
Pumice Stone, selected.......... by bbl 10
" " " small lots.......... 12
Sponges.......... per lb. 75
Red Grit.......... " 05
Nova Scotia Blue Grit.......... " 05
Common Coarse Grit.......... " 01
Oxalic Acid.......... " 20
Sand.......... per bbl. 1 00
Cloth, 52 in. wide.......... per yd. 6 00

ITALIAN MARBLE— Cu. ft.
Monumental stock..........$4 75
Slabs over 2 in. thick, full size of block.......... 4 25
" " 2 " cut to size.......... 4 75

Superficial—

	Full size.	Cut to size.
⅞ in. slabs	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Cu. ft.
Tennessee Red..........$2 50@$5 00 f. o. b. Chicago
" Knoxville.......... 3 00 " "
Vermont White.......... 3 50@ 8 00 " "
Ophite.......... 4 50@ 5 00 " "
Armedite.......... 1 50 " "

Discounts—
Settlements are required within 30 days from date of invoice—by cash less 3 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 34 000 pounds or more in one order.

TOOLS—
¼ in. Mallet or Hammer Heads,..........per doz. $1 25
5-16 " " " " .... " 1 50
⅜ " " " " .... " 1 75
7-16 " " " " .... " 2 25
½ " " " " .... " 3 00
Tools over ½ in..........per lb. 32
Frosting Tools..........per doz. 3 00
⅜ in. Granite Lettering Tools.......... " 2 50
½ " " " " .... " 3 00
Bush Hammers..........from $4 00 to $8 00
Mash " .... " 2 00 to 3 00
Toothed Axes..........each 3 00
Crandalls.......... " 2 50
Drill Stock, Nickel Spool.......... " 6 00
" Brass " .... " 5 00
" Iron " .... " 4 50
Steel Bows and Wire Spring.......... " 2 00
Bitts..........per doz. 2 75

BEST HICKORY MALLETS—
2 to 3 lb..........each, $ 50
3 to 5 lb.......... " 75
5 to 7 lb.......... " 1 25
8 lb. and up.......... " 1 50

[J. H. Knippenberg, Cleveland, O.]

Stone Cutters Mallets..........$12 00 Doz.
Wooden Rolls for stones 3 feet long 4 5 6 7 8 in.
20c 35c 50c 65c 75c each

SPECIALS—
Diminished Dies, extra..........per cubic foot.......... 50c
Strips ordered 7 ft. long and over, extra per cubic foot 50
Sawing edges slabs, 1 inch thick per superficial ft.......... 03
" " " 2 " " " " 05
" " " 3 " " " " 08
" " " 4 " " " " 10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above

SAND RUBBING—
Monumental Stock..........per cubic foot.......... 35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot.......... 05
Headstones ordered rubbed edges, extra per 2 inch superficial foot.......... 05
Hearths..........per surface foot rubbed.......... 05

GEORGIA MARBLE—
[The Blue Ridge Marble Company Cincinnati, O.]
Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$5 50	$6 85
Kennesaw, average	5 00	6 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 40
Cherokee average	2 75	3 10
No. 3 base Strips and Posts	1 50	1 95
Inferior No. 3 Posts and strips	1 25	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	95
Markers, 16 to 18 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	25	33
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	36
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	50
Strips ordered, 9 feet long or over, extra	50	50

Urn list, sent on application

MACHINERY.

STEAM PUMPS—

	Discount
Smedley's	25 per ct.

PULVERIZERS—

	Discount
Cyclone	20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete	$900

EXCAVATORS—

Little Giant	$1,500
Railroad Giant	8,500

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting, Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20	25 00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$50.00
" 0	" " " " with "	54 00
" 1	" 24x37, " 10 with hood	40 00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 5,	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Iron	33⅓
Steel	37½
Gal. Iron	33⅓

(Washburn & Moen M'f'g. Co.)

Iron	33⅓
Steel	37½
Gal. Iron	33⅓

BLOCKS AND TACKLE—

(Toledo Block Works.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron bushed	2 40	4 50	6 30
10 " "	3 30	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	6 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	29 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00

Wrought-iron Tackle Blocks	Single	Double	Triple
6 inch	1 40	2 25	2 75
8 "	2 40	3 50	4 50
12 "	4 55	8 10	10 40
16 "	9 55	15 70	22 00
20 "	22 00	33 40	50 00

Iron-bushed, discount 20 per cent; roller bushed discount 10 per cent

(Detroit Block Works.)

Discount from list	40 per ct.

WROUGHT-IRON PIPE—

(American Tube & Iron Co.)

	Discount
Butt weld black	55 per ct
" " galv.	45 "
Lap " black	65 "
" " "	65 "

BELTING-RUBBER.—

Standard	60 per ct. and 10 per ct.
X quality	50 " " 10 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz
Common, nailed	11 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	33 00

RED SANDSTONE.

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	.60c
Dunreith	.50c
Darlington	.40
McArthur	.45
Carlisle	.65
Potomac	.50

SLATE.

ROOFING SLATE—

[Henry Fulmer, Easton, Pa.]
F. O. B. Slatington, Pa.

Size.	No. in sq.		Size.	No. in sq.	
14x24	98	$3 50	10x18	192	$3 76
13x24	106		9x18	214	
12x24	115		10x16	222	
12x22	127		9x16	247	
11x22	138		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft.
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 18 cents square foot in car lots.

[Coulman & Westcott Fairhaven Vt.]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17
For rubbing both faces of above, excepting caps and trusses extra	02
Any of the above unrubbed less	01
Steps, to 5 ft. in length	20
Steps, 5 ft. to 8 ft. "	25
Steps larger	special
Platforms to 16 sup. ft.	20
" 16 to 22 " "	25
" 22 to 28 " "	30
" Larger	special

Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscotting, sup. ft.	20
Black Boards, ⅜ to ⅝ up to 3 ft. wide, crated sup. ft.	18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft.	20
Black Boards, 3½ ft. to 4 ft. wide crated, " "	22
Thresholds to 5 ft. in length " "	20
" 5 ft. to 8 ft. " " "	25
Curriers' Slabs, faced one side crated, " "	30
Curriers' Slabs faced two sides, crated, " "	34
Billiard Table Beds, crated, " "	22
Imposing Stones, " "	30
Grave Covers, sawn and planed only, and in two or more pieces. " "	16
Grave Boxes, rabbeted ends, " "	20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	16
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	20
16 to 22 " "	25
22 to 28 " "	30

Vermont Red	$13 50	f. o. b. Chicago.
" Purple	5 60	" "
" Green	5 50	" "

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x16, 15x20	2 65	"
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 75	" "
Maine	5 50@5 80	" "

BLACK—

(Michigan Slate Co., Lansing.)

Michigan	$5 50 f. o. b. quarry

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft.
No. 1 Promiscuous block	50c
No 2 " "	40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	40c
No. 2 " "	30
No. 1 Monument Bases, broken to size	45
No. 2 " " " "	35
Pier Blocks " "	20

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 6 " "	09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	25c
6 " " "	46
9 " " "	68
12 " " "	88
3 in. Berea or Blue Amherst	21
6 " " "	41
12 " " "	77

SAWED PLATFORM—

	Sq. ft.		Sq. ft.
Buff Am. 6 in. No. 1.	46c	No. 2	40
" 8 " "	60	"	53
" 10 " "	73	"	67
" 12 " "	88	"	78
Berea or Blue Amherst 6 in No 1	41	"	36
" " 8 " "	53	"	48
" " 10 " "	65	"	59
" " 12 " "	77	"	67

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	10
2½ " "	12
3 " "	14
4 " "	18

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—

	Cu. ft.
No. 1	30c
No. 2	25

(French Fort Quarry, New Castle, N. B.)

Olive	40c f. o. b.

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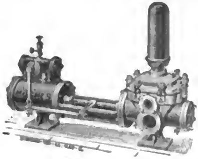

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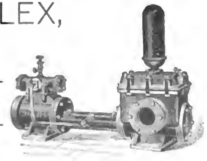

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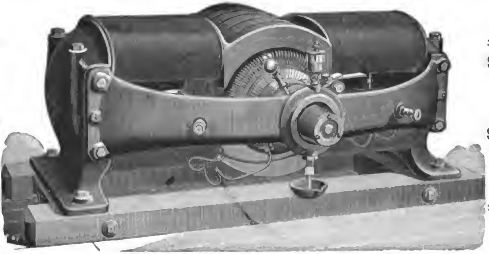

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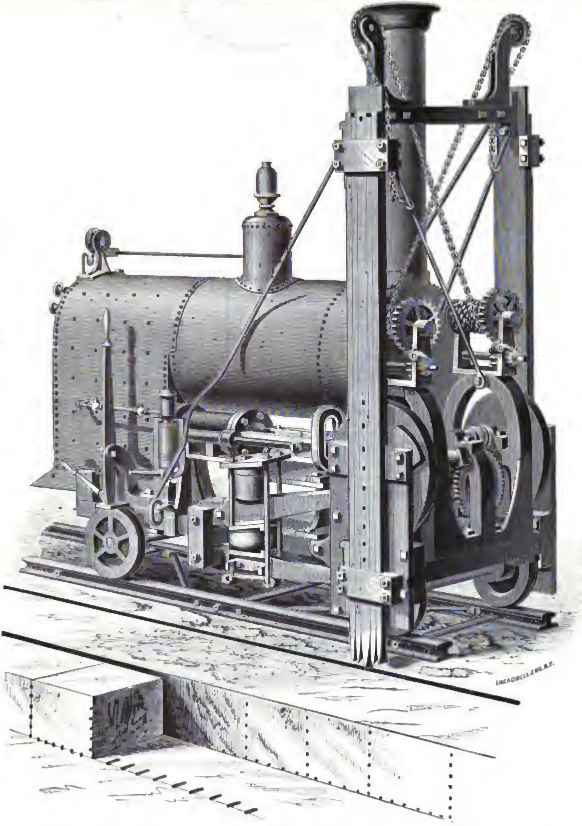

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STONE

VOL. I. INDIANAPOLIS, IND., JULY, 1888. NO. III.

STONE

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

PUBLISHED MONTHLY BY

THE D. H. RANCK PUBLISHING CO.

(INCORPORATED.)

D. H. Ranck, Pres't and Treas. A. K. Hollowell, Vice-Pres't.
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Subscriptions are coming in pretty lively, but we can stand any rush possible. If the quarryman, stonemason, marble worker, marble dealer, stone dealer, mason, contractor or architect, who fails to get value of the subscription in each number of Stone, will send his name and address we will dead-head him a year for his lack of appreciation.

"What's the matter with Harrison?"
"He's all Right!"
"What's the matter with Cleveland?"
"He's all Right!"
But here's a question without a shadow of doubt in it:
What's the matter with Stone?
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Now is the time to subscribe!

Quarrymen, let us know how trade is in your section.

Marble workers, give us your ideas of shop practice, that your brethren may profit thereby. Let us be the medium of that fellowship which should exist among all tradesmen.

Granite cutters, do likewise.

Marble dealers, counsel with each other through our columns. It will bring you closer unto each other.

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To the trades, and all their kindred which Stone fully, and in a measure represents, back it up with your aid and counsel, and we promise you the brightest and best periodical possessed by any class of business men and mechanics in this country.

Stone is here to stay, to grow, to educate, to assist every one who takes confidence in it.

This is our issue No. 3.

Did you ever see a healthier looking infant?

Mention was made of the decline in the use of terra cotta without attempting to give all the reasons, therefore we may state that one is, that terra cotta has been pressed into use where in the nature of things it was not intended that it should go. While it is a valuable, legitimate building material, there are certain limitations which, when overreached, cause a reaction against the use of that material. The very quality which makes terra cotta less expensive, in some instances, than stone work, also renders it less satisfactory from an artistic standpoint. We refer to the duplication of parts from a mold. Where work is done in this way, there is always a machine-made, common appearance which is readily discernible. On the other hand, where the work is modeled and then burned, it is almost as expensive as stone, and it is well nigh impossible to have the burning so uniform as to have all the joints satisfactory. This is true of all kinds of terra cotta work, and has caused a certain amount of unpopularity which belongs to this material at this time.

Producers and dealers in stone, marble and granite will find in organization the most potent agency to overcome the evils that beset the trade. The fact cannot be gainsaid that the closer business men draw nearer to each other, and exemplify the golden text that every man is entitled to the same respect and consideration that each man asks for himself, the general business will be improved and the conduct of it more satisfactory to the individual and to the community. Therefore, let the stone, marble and granite men everywhere in this country and Canada, encourage the movement that has taken course to accomplish this desirable and beneficent purpose. In this issue of Stone is presented the official call for two important meetings—one of the New England men at Rutland, Vt., on the 24th inst., and of the National Association, and of the Ohio Association, at Cleveland, on the 11th and 12th insts.

We trust both of these meetings will be largely attended. Every firm owes it to itself to have a representative in attendance at one of these conventions. United effort is what accomplishes desired results. Work cannot be done, nor can benefits to the trade be secured, if a majority of those interested take a listless interest in affairs that are of common import.

Organization is the watchword!

There are unprincipled men in all lines of business. There are a great many such men engaged in the marble and granite trades. They are the wolves of the business—men who will sell anything, to anybody, at any price, to keep the business away from the neighbor who is a conscientious man, who has a reputation for the integrity of his work, and a character for square dealing. What does prestige for doing good work and dealing in first-class material amount to in the estimation of such men? Acting on the principle that the flimsy specimen of their handicraft will outlast the period fixed for a settlement in full with the customer, they cut and slash to secure that customer, and the victim is caught by the bait of cheap prices and fictitious ornamentations. Most marble and granite dealers "are not built that way." For that are the people thankful. A reputation for selling pure goods at reasonable prices are worth more to them than a contract let to the lowest bidder without qualification. But it is these low bidders, these dealers in imperfect material, who have so unsettled trade, so misused the confidence of purchasers who must in the very nature of things rely upon them for fair treatment, that has brought so much discredit upon the marble and granite business.

Let an end be put to such disgraceful proceedings. It can be done by responsible dealers uniting in opposition to such methods—in marking for public reprobation the individual who carries on a bogus business and in the creation of a uniform standard for excellence for every grade of work—monumental, architectural or otherwise. This is the work cut out for the district and national associations of marble and granite dealers. It commends itself to every honest man in the trade for his active assistance.

REGENT PATENTS.

ISSUE OF MAY 22, 1888.

No. 383,170—Iron-Building Construction. Leroy S. Buffington, Minneapolis, Minn. Filed Nov. 14, 1887.

CLAIM.—1. A building having a continuous skeleton of metal, a covering of veneer, and a non-conducting packing between the skeleton and veneer, for the purpose set forth.

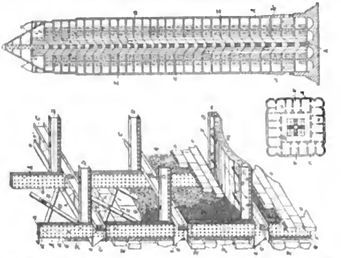
2. In a building frame, a continuous diminishing laminated post formed of layers of metal plate secured together and arranged to break joints and decreasing in number toward the top.

3. In iron-building construction, the combination with a framing composed of continuous laminated posts suitably connected by braces and girts, of tie-beams secured thereto and to one another, substantially as set forth.

4. In iron-building construction, the combination with a framing composed of continuous laminated framing posts suitably connected by braces, of an exterior covering of non-conducting material, for the purpose set forth.

5. In iron-building construction, the combination, with a framing composed of laminated posts suitably connected by braces and girts, of an exterior covering of non-conducting material, and a stone or other veneering exterior thereto and supported on shelves secured to the framing, substantially as set forth.

6. In a frame for a building of two or more stories, a series of tapering posts extending from base to top of the frame and formed of metal plates in layers and secured with their flat sides together and arranged to break joints, and braces and girts for connecting and securing the post, substantially as set forth.



7. In a building frame, a series of continuous framing-posts composed of metal plates secured with their flat sides together and breaking joints, in combination with girts and tie-beams secured thereto at each floor, substantially as set forth.

8. The combination, with the laminated posts, of the continuous girts secured thereto, and the tie-beams, also secured thereto and to one another, substantially as set forth.

9. The combination, with the framing-posts and braces, of the wire lath or equivalent coverings, the non-conducting packing and the veneering supported by the shelves, and anchor-rods, substantially as and for the purpose set forth.

10. The combination, with the building-frame composed of the laminated posts, girts tie-beams, and pillars arranged to form a central well, of the elevator-shafts and stairs arranged therein, substantially in the manner set forth.

11. The combination, with the building-frame constructed with a central well, of elevator-shafts arranged in the corners of such well and flights of stairs rising from opposite sides of such a well to a central landing, and other flights rising from said landing to the other sides of such well, substantially as set forth.

12. The combination, with the posts and girts forming the outer frame of the beams having their outer ends secured to the posts, and their inner ends secured to beams that are transverse to them, the pillars therefor, and the diagonal tie-rods, substantially as set forth.

13. The combination with the posts and girts, of the angle-plates connecting them and forming supports for the veneer shelves.

14. The combination, with the posts and their braces, of the plates forming the self-supports, the veneer, and the anchor rods, substantially as set forth.

ISSUE OF JUNE 5, 1888.

No. 383,932—Composition for Making Cement. Justus Wolff, Union, N. J., assignor of three-fourths to Sarah B. Folkers, Brooklyn, N. Y. Filed March 7, 1887.

CLAIM—A building material consisting of a mixture of dry powdered slag, dry powdered slacked lime, and coal-ashes, substantially as set forth.

No. 383,942—Composition of Matter for Paving-Blocks, etc. Charles E. Coffin, Denver, Col., assignor of one-half to Robert N. Jones same place. Filed April 13, 1888.

CLAIM.—The composition of matter hereinbefore described, consisting of silica, oxide of iron, lime, alumina, barium, zinc, manganese, and lead combined in the proportions substantially as set forth.

No. 384,125—Feeder for Stone-Sawing Machines. Philip Christa, Detroit, Mich. Filed Nov. 1, 1887.

CLAIM.—1. The combination, in a feeding device for stone-working machines, of a vertical rotating shaft, I′, the radial hollow arms O′, communicating with the said shaft, and the hoods at the outer ends of the said hollow arms, for the purpose set forth, substantially as described.

2. The combination, in a feeding device for stone-working machines, of the vertical rotating hollow shaft I′, to which water and grits are supplied, the vertical sleeve M′, attached to the said shaft and vertically adjustable thereon, the hollow radial arms O′, extending from the sleeve M′ and communication therewith, and the deflecting-hoods at the outer ends of the said arms, for the purpose set forth substantially as described.

3. The combination, in a feeding device, for stone-working machines, of the rotating vertical hollow shaft I′, the tubular radial arms O′, communicating with the said shaft and rotating therewith, the extensible sleeve I′ on the said radial arms, and the deflecting-hoods at the outer ends of sleeve substantially as described.

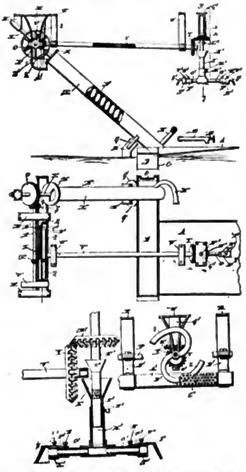
4. The combination of the vertical rotating hollow shaft I′, the radial hollow arms O′, communicating with the said shaft, the extensible sleeves on the outer ends of the said hollow arms and the deflecting-hoods having the collars attached to the said sleeves and adjustable thereon substantially as described.

5. The combination in a feeding device for stone-working machines, of the rotating inclined elevating-screw, the trough to receive the water and sand from the said screw, and the rotating hollow shaft V, having the scoop-arms Z, working in the trough, for the purpose set forth, substantially as described.

6. The combination of the trough A′, having the sieve C′, and the compartments D′, with the rotating hollow shaft V, having the scoop-arm communicating therewith and working in the compartment D′, substantially as described

7. The combination of the trough A′, having the sieve C′, and the compartments D′ with the rotating hollow shaft V, having the scoop-arm Z, working in the compartment D′, and the radtel arn E′, wording in the trough on the outer side of the sieve, substantially as described.

8. The combination of the elevating screw, the trough to receive water and sand therefrom, the hollow shaft V, geared to the screw and having the scoop arms Z, working in the trough, and the spraying device geared to the said hollow shaft, and in which the contents of the latter are discharged, substantially as described.



9. The combination of the elevated trough, the rotating hollow shaft V, having t scoop-arms Z, working in the trough, the vertical perforated hollow shaft F, geared the shaft V, and having the funnel K′ below the discharged end of the latter, and hollow radial arms connected to and communicating with the shaft F′, substantiall described.

10 The combination, with the tube V, of the vertical rotating tubular shaft F′, ha the beveled flange L′ above the discharge end of the tube V and the funnel K′ belo same, and the radial hollow arms O, communicating with and connected to the end of the tubular shaft L′, substantially as described.

11. In combination with the elevating rotating screw F, the hollow case L, ing the same and rotating therewith, the scoop N on the case, the trough A cating with the case L, the hollow shaft V, the scoop Z on the said shaft, wor trough A′, and the spraying device communicating with the shaft V and r supply therefrom, as set forth.

12. The combination of the rotating incased screw having the shaft I projecti

upper end, the bearing K, in which said shaft is journaled, the trough at the upper end of the screw, the trough at the lower end thereof, and the anti friction rollers supporting the lower end of the screw, substantially as described.

13. In combination with the hollow shaft I', carrying the spraying devices and having the funnel or supply-nozzle K', the hollow rotary shaft V, discharging into the nozzle-funnel K', the scoop Z on the shaft V, the trough A', in which the scoop Z works, the rotating case L, communicating with the trough A', the screw F, working in the case L, and the scoop N on the case, as set forth.

14. In combination with the hollow shaft I', carrying the spraying devices, the hopper A arranged under the spraying devices, the trough B, communicating with the hopper, the case L, carrying the scoop N, working the trough B, the screw F in the case, and the hollow shaft V, receiving its supply from the case L and delivering it to the shaft I, as set forth.

ISSUE OF JUNE 12, 1888.

No. 384,296. Manufacture of Articles from Hydraulic Cement. John W. Stockwell, Portland, Me. Filed Mar. 15, 1887.

CLAIM.—1. The herein-described improvement in the art of manufacturing artificial stone from hydraulic cement and sand or other like material, which consists of first mixing the materials together when in a dry state, then compacting them into suitable molds, and then allowing them to absorb sufficient water to moisten the mass and to effect the chemical combination, substantially as described.

No. 384,421. Fire-Proof Floor. William H. Brown, Indianapolis, Ind. Filed Jan. 3, 1888.

CLAIM.—1. In the construction of a fire-proof floor, the combination, with the floor-beam of a sleeper provided with a longitudinal recess, a device formed with a head, adapted to fit into said recess, arranged to bear against the under side of said sleeper, and a hooked forwardly-extended portion arranged to engage with the flange of the floor-beam, substantially as set forth.

2. The combination, with the floor-beam, of a sleeper formed in two parts, with a longitudinal groove at its bottom and a longitudinal recess in its top, a device engaging with said longitudinal groove in its bottom, and the flange of the floor-beam for securing them together, the flooring arranged on said sleepers and secured thereto by nails driven into the longitudinal recess in the top of said sleepers and clamped between the sides thereof, substantially as set forth.

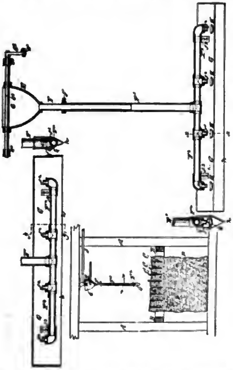
3. In a fire proof floor, the combination of the sleeper formed with a recess in its top extending longitudinally thereof, and formed with substantially straight sides arranged to clamp the floor-nail when driven into said recess, and the flooring laid upon said sleeper and secured thereto by nails driven through said flooring and into said recess in its top, between the sides of which they are clamped, substantially as set forth.

No. 384,541. Building-Block. Harmon S. Palmer, Chattanooga, Tenn. Filed Feb. 15, 1887.

CLAIM.—As a new article of manufacture, a hollow rectangular concrete building-block having a projecting tongue on its top and a groove in its lower side, the tongue of one block fitting in the groove of the superimposed block, and the ends of the block being provided with a series of scallops or vertical corrugations extending entirely across the end thereof, substantially as described and shown.

ISSUE OF JUNE 19, 1888.

No. 384,615—Sand and Water Distributer for Stone-Sawing Machines. John H. Frenier, Rutland, Vt., assignor of one-half to Leon Leblanc, same place. Filed June 24, 1887.



CLAIM.—1. The combination, with a reciprocating saw sash or frame and a gang of saws therein, of a sand and water distributer pivoted parallel with the line of movement of the saws and a rod of connection for imparting to the distributer an oscillating or swinging movement transverse to such line of movement of the saws, substantially as herein described.

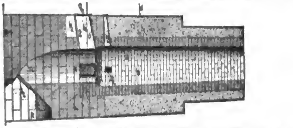
2. The combination, with a reciprocating saw-sash and a gang of saws therein, of a water and sand receiver supported on a pivot above the saws, a pipe depending from the receiver, a horizontal pipe connected to the lower end of the depending pipe and having outlet-opening in its under side for the escape of sand and water, and a rod or connection whereby the receiver and pipes are swung upon said pivot, substantially as herein described.

3. The sand and water distributer herein described, consisting of an elevated receiver, a pipe leading downward therefrom, a horizontal pipe with which the lower end of the downwardly-extending pipe communicates and which has an outlet at intervals in its length, and a trough within which the horizontal pipe and its outlets deliver and the sides of which converge to form a narrow slot at the bottom, substantially as herein specified.

4. The sand and water distributer herein described, consisting of a reciever E, a pipe leading therefrom, the cross-pipe F^2, having outlets f^2, and the trough G the sides of which converge downward to form the narrow delivery-side *h*, and which is provided with abutments ii opposite the several outlets, substantially as herein specified.

No. 384,896. Limekiln. James W. Devling, Flemington, Pa. assignor of seven-eighths to Amelia E. Devling, same place. Filed Oct. 14, 1887.

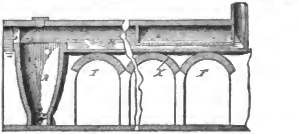
CLAIM.—1 A limekiln comprising a stone base formed with a lower cooling-chamber, one side of which is gradually curved toward a lower exit opening, and the opposite wall straight and having radially-arranged burning-chambers in the upper part thereof, and gas-ports over said burning-chambers, a cupola consisting of an inner fire-brick wall built



into the upper part of the stone base, the inner opening of which aligns with and forms an upward continuation of the lower cooling-chamber, an outer metallic shell surrounding the inner fire-brick wall to form a compartment therewith, and having a shoulder formed therein to increase the extent of said space between the inner fire-brick wall and outer shell adjacent to the greatest point of heat radiation, and a packing of ashes between said inner fire-brick wall and outer metallic shell, and of increased thickness adjacent to the stone base, substantially as described.

No. 384,906. Kiln for Burning Hydraulic Cement. Charles R. Gostling, Whitehall, assignor of one-half to Saml. R. Wellington, Catasauqua, Pa. Filed Nov. 2, 1887.

CLAIM.—1. An apparatus for drying and burning hydraulic cement, consisting of a vertical kiln opening at the top into a horizontal chamber, in which the slip is dried preparatory



to burning, and through which all the products of combustion from the kiln pass on thei way to the smoke-stack, as set forth.

2. In kilns for burning cement, a vertical kiln in which the cement is burned, a horizontal tunnel or tunnels communicating with the upper portion of the vertical kiln, said tunnels being divided into compartments, around which the waste products of combustion from the burning-kiln are caused to pass on their way to the stack, as set forth.

TRADE-MARKS.

15,476—Plaster Compositions for Architectural Purposes. Adamant Manufacturing Company, Syracuse, N. Y. Application filed April 16, 1888. Used since January 1, 1887.

"The word 'Adamant,'"

15,482—Stains for Mortars and Cements. S. Bowen's Son's, Philadelphia, Pa Application filed April 2, 1888. Used since February 15, 1888.

"The representation of a triangle."

15,513—Mortar Colors of all Shades and Tints. Ricketson Mineral Paint Works, Milwaukee, Wis. Application filed February 24, 1888. Used since December 1, 1887.

"The words 'Red Brick.'"

15,530—Artificial Stone and Cement and Concrete Pavements. William Krause & Son, Philadelphia, Pa. Application filed April 17, 1883 Used since March 31, 1888

"The representation of a star."

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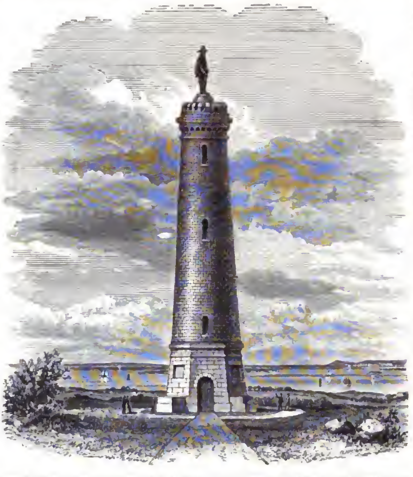
One of the human footprints found in volcanic rock in Nicaragua several years ago is described by Dr. D. G. Brinton as being 9½ inches long, three inches wide at the heel and 4½ at the toe. The apparent length of the foot itself is eight inches. Dr. Brinton considers the footprints genuine, but is uncertain whether they are so ancient as has been supposed.

THE STANDISH MONUMENT.

A WELL-KNOWN architect was looking at a monument on which a figure was perched high up in the air on a small standing space. He asked: "Was he an acrobat?" We all know that Myles Standish was not an acrobat. In nature he would have stood with fear and trembling upon the eminence as here pictured. This sort of thing is all well enough under ordinary circumstances in the case an allegorical figure, but here we have Myles Standish in an attitude which is uncomfortable to a sensitive person. If there were other features of excellence about this monument we would not make mention of this matter, but in the structure as whole there is an absence of beauty. It is without an idea; it is inartistic. A huge pile with a colossal statue on top of it.

The design was probably selected without the benefits of artistic guidance by those whose principal thought was to erect a monument and not exceed the estimate. This is all right as far as it goes, but it does not go far enough. It does not start right.

The spot chosen for the monument is on Captain's Hill, on the old Standish farm at Duxbury, Mass., where Captain Standish lived and died, and where stands now the house erected by his son in 1667, near the site of the old homestead, burned in 1666. The farm was given to him by the colony about 1630, and remained in the family until the middle of the last century. The hill is 180 feet high, and overlooks Plymouth and Duxbury harbors, and is now much used as a sighting point to navigators in entering Massachusetts Bay. When the shaft is finished it will be most useful to the coast survey as well as to navigators.



The monument will be, when finished, one hundred feet from the grade to the top of the parapet or base of the statue. The diameter of the base is twenty-eight feet, and at the top sixteen feet. The base is octagonal to the hight of twenty-five feet, or to the hight of the projection of the lower cornice; above this the monument will be perfectly round. The foundation runs eight feet below the surface of the ground, and is laid in solid hydraulic cement. The granite base of the monument up to the first projection, or cornice, is of dimension granite of the first quality, rough, split faces, with hammered beds and builds. The entire upper cornice will also be rough, split granite. There will be eight granite posts and lintels inside to support the brick cone. The posts are hammered granite, twelve feet long. The granite for the shaft will be irregular blocks, and no course will be less than eight inches nor more than twelve inches rise outside. The inside above the octagon base is laid up with common rubble stone, the whole in cement mortar, pointed and neatly plastered inside. The brick cone supporting the stairs is to be of the very first quality of brick, laid in cement mortar. The dome, or ceiling, will be of eight-inch brick; the roof will also be of the same material. The treads of the stairs will be of North River stone, four inches in thickness and twelve inches wide, and built into the wall at each end as the same is carried up. The monument will be surmounted with a stone statue of the Captain of Plymouth, in full uniform, fourteen feet in hight and will be a truthful likeness. The structure at present is 72 feet high, and has cost $27,000.

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TO THE MARBLE NEN OF NEW ENGLAND.

PETERBOROUGH, N. H., JUNE 26, 1888.

To the Retail and Wholesale Marble Dealers of New England and the Provinces

GENTLEMEN: On the 15th of last March, about one hundred of the representative marble men throughout New England assembled at Boston, and the undersigned were elected a committee to determine upon a time and place, and issue a call to retail and wholesale marble dealers of New England and the provinces, to come together and and take into consideration the matter of the information of a permanent association, and also to prepare and present for their action, a form of constitution and by-laws. In compliance with this duty we meet, and after due consideration unanimously determined upon Rutland, Vermont, Tuesday, July 24th, 1888, as the place and time, and take pleasure in presenting to you the following program for a three days' trip:

Tuesday, July 24th, a special train for your exclusive use will leave Boston, from Fitchburg Railroad depot, at 1 o'clock p. m., stopping at Ayer, Fitchburg, Winchendon, Keene and Bellows Falls, giving an opportunity to dealers on the line of the Fitchburg and Cheshire Railroads holding tickets to take the train at any of those stations, arriving at Rutland about 7 o'clock p. m. After supper at the Bardwell House, the members will assemble in an informal social way, and it is desired that each constitute himself a committee of one to bring about, at this period of the trip, a more extensive acquaintance among the members of the party.

Wednesday, July 25th, carriages will be taken in front of the hotel, in the morning, for Center and West Rutland. Returning to the hotel, an afternoon train will be taken for Proctor (Sutherland Falls.) Returning to the hotel by train, the formal meeting of the members will be held, and the most important matter of the excursion, that of forming an association, will be taken up.

Thursday, July 26. No program has been prepared for the forenoon, it having been thought advisable to leave it at the disposal of each to spend the time as he thinks best. At 1 o'clock the return train will leave Rutland, arriving at Boston about 6 o'clock p. m.

The Wednesday trip can be changed, if it is thought advisable, so that carriages can be taken from Rutland through Center Rutland to Proctor, where dinner can be had, then to West Rutland and back to Rutland, thus visiting all the quarries in the entire trip of 17 miles by carriage. After the start is made from Boston, any changes in this proposed program, consistent with previous arrangements made with railroads, hotels, etc., will be in the hands of the excursionists.

It is particularly requested that the ladies accompany this excursion, and a special effort will be made to render the trip interesting and enjoyable to them. Nearly all the retail dealers with whom we have conversed on the subject, expressed a desire that their wives, sisters, or possibly sweethearts, accompany them, and their presence is earnestly solicited.

The train will be a special one throughout, consisting of a locomotive, smoker and baggage car combined, a Pullman coach, and an ordinary car, on which none but members of the trade and invited friends will be allowed to ride. The railroad fare to Rutland and return, from any of the above stations, will be $5, and as a guarantee of the cost of the train, one hundred tickets at least must be sold. There will be two kinds of tickets, costing $5 and $10; the $5 tickets will include simply the railroad fare to Rutland and return, this being one-half the regular fare on ordinary trains; the $10 tickets will include railroad fares, hotel bills, carriages, and all necessary expenses. We send you this circular letter to ask you to decide on which kind, and the number of tickets you want, which you will indicate by filling out and returning the enclosed postal card immediately, that ample time for arrangements can be had. You rarely, if ever, knew of a special train excursion with this sumptuous accommodations here offered at this extremely low figure, especial efforts being made in this direction to insure a large party, and we certainly hope there are few in the business who will not see its advantages and embraces the opportunity offered. We hope all will take the $10 tickets, but it is absolutely necessary that one hundred tickets in all be sold to insure success. Should any of the party desire to remain longer, they can do so, and return on their ticket by any train on or before Tuesday, July 31st.

To all dealers who will attend the meeting a copy of the draft of a constitution and by-laws to be by us submitted to the meeting, will be sent them in ample time to allow all to study it and be prepared to offer any improvements. It will be printed on a sheet from type which will be left standing until after the meeting, so that any changes or additions can be made. Other information and details of the trip will be at the same time sent.

We most earnestly desire to impress upon each individual member of the retail and wholesale trade of New England and the Provinces the great importance it is to him to accompany this excursion, and the vast good that would come to each alike by the formation and carrying into effect of an efficient association as proposed, and the absolute necessity of his presence to insure the successful carrying into effect of plans proposed. We have not met a man in the large number we have conversed with on this subject, who offers any objection to the formation of an efficient association, but if such there should be, we would ask him: Have you any better plan to offer than for us to get together and take steps to advance in every direction the best interests of our business? Is there, indeed, any other way? Does not the present condition of our business imperatively demand it? This is no mere sentimental appeal we make, and it is not simply a pleasure trip we propose, although we intend to make the pleasure of the trip an important incident thereto, but it is as one dealer very plainly expressed it, "a bread and butter question," an important, practical matter, appealing directly to your pocketbook.

Is your acquaintance with the individual members of the trade as extensive as you would desire? Do you not think that a better acquaintance and the consequent friendship naturally following, would be to your advantage? Can you not get along better with a competitor with whom you are on friendly terms than if you were strangers or perhaps enemies? Are the prices you are getting for your work satisfactory? Would it be for your best interests to have them advanced to a fair price so we could get the per cent. of profit obtained by other retail trades? Take these questions, we beg you, under serious consideration, and then ask yourself as practical business men, should you remain away and not lend your aid in bringing about this better condition of things? We believe there is not a man in the business who has a moral right to be indifferent in this matter, nor who can afford to pass this project lightly, and remain away from this meeting. Nothing of more importance, in a business way, can be on your mind or demand your attention; bear in mind this step cannot be taken without your co-operation, it matters not how earnest the undersigned may be to accomplish it.

We believe the better spirit of the age in which we lived has infused itself into the personnel of our trade, and that we are growing more liberal, charitable, tolerant and generous. We believe that our condition is now ripe for a more successful carrying into effect of the benefits of an association than it has been, and that we ought now to take steps to elevate our trade before it is debased below the hope of redemption. What say you?

Hoping you will immediately return the inclosed postal card filled out as directed to Mr. Brennan, our Secretary, not later than July 10th,

We remain yours obediently,

Robert L. Saabe, Cambridge, Mass.
James F. Brennan, Peterborough, N. H. } Committee.
Albert Moran, Roxbury, Mass.

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ANALYSIS OF COLUMBIAN MARBLE,

Columbian Marble Co., Rutland Vt., by Sam'l. Penfield, Yale College, New Haven, Conn.

LIGHT CLOUD.

	Duplicate Analysis.	
Carbonate of lime, Ca. Co.	96.30	96.37
" magnesia Mg. Co.	3.06	3.06
" iron	.053	.053
Insoluble in acids	.63	.63
Organic matter (graphite)	.004	.004
	100.047	100.117

DARK VARIEGATED.

Carbonate of lime	98.37	98.36
" magnesia	.77	.77
" iron	.034	.034
Manganese and alumina oxides	.005	.005
Insoluble in acids	.63	.63
Organic matter (graphite)	.08	.08
	99.889	99.879

The iron, organic matter and insolubles were determined in a large quantity so as to make the result of such small quantities accurate. The percentage of metallic iron corresponding to the carbonate in the light cloud, 0.026 and in the dark variegated, 0.016.

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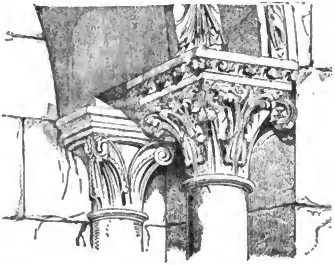
DYNAMITE FOR BUILDING.

Paradoxical as it may seem, the latest thing for which dynamite has been employed is not the blowing-up of buildings, but on the contrary, the laying of their foundations. This new development is due to M. Bonnetond, a French engineer. When a foundation has to be laid in wet ground, he bores a hole from ten to twelve feet deep and an inch and a half wide. Into this hole he passes a string of dynamite cartridges, which are then exploded. Not only is a cavity of a yard wide produced by the explosion, but the expansive force of the dynamite drives the water out far beyond the sides of this cavity, and it does not return again for more than half an hour. In the meantime the workmen clear the cavity, and introduce quickly setting concrete; so tthat, when the water returns again, it cannot injure the foundation. The method has been put into practice during the building of an *enceinte* at Lyons, and a rapid rate of working is said to have been attained thereby.

CAPITALS.

CAPITALS here shown are from the Rouen cathedral which was constructed in and between the thirteenth and sixteenth centuries. These are the original forms of capitals which have been used to some extent in some of the modern imitations in this country, and is the origin of some very pretty work. We take pleasure in presenting them in this way. Several years ago there was a mild gothic revival in this country and a few of the architects of the East did some very creditable work with the limited means at hand. To be strict we will say that the limit was not so much a matter of money as it was of other means, knowledge, time and resource. But the efforts for this kind of architecture has not been constant.

The monumental designers have a great deal to learn in the details which we present in this number. By monumental designers we mean those who design work of the tombstone order, A very large number of these gentlemen are in a deep rut, and the worst of all is that they are so complacent. They look up, but they see no light that is so pleasant as that which reflects from their grim surroundings. We often see a monument which is made up of a shaft, a carved cap and an urn. There are very few variations—the same old clumsy moldings, the graceless cap and the urn with the string tied to it. The string is provided so that if the design by any chance should depart too far from the good old urn of our fathers that it could be pulled back again. We have these details which are represented as being parts which we offer to be used in the monumental work of the future. We are in no haste, but we hope to see a change in time,



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METALLIC CEMENT FOR STONE.

The restoration of some of the most important stone structures in Paris, such as the colonnade of the Louvre, of the Point Neuf, and of the Conservatoir des Arts et Metiers, has been mainly accomplished by means of a metallic cement invented by Professor Brune. It consists of a powder and a liquid, the first composed of two parts by weight of oxide of zinc, 2 of crushed limestone and one of crushed grit, the whole intimately mixed and ground, ocher in suitable proportions being added as a coloring matter; the liquid employed consists of a saturated solution of zinc in commercial hydrochloric acid, to which is added a part, by weight, of hydrochlorate of ammonia, equal to one sixth that of the dissolved zinc, and this liquid is diluted with two-thirds of its bulk of water. One pound of powder mixed with 2½ pints of liquid.

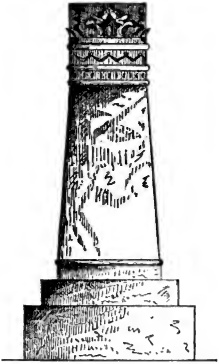
MEMORIAL SCULPTURE.

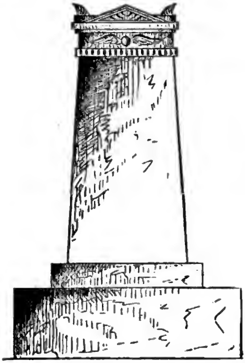
We present below two specimens of memorial sculpture, both of which present admirable detail, but the first is so palpably unsuited to the environment of the cemetery as to be apparent to the most unprofessional observer. They are types, too—one of logical sentiment applied to a logical perception of the eternal fitness of things; the other an exuberant fancy unregulated by a reasonable conception.

The first example is a copy of a memorial tablet from a Turkish cemetery at Beirut, Asia Minor, with an antiquity certainly extending to the tenth century, and possibly extending backward to the post-Roman period. The second is a copy of tablet in Pere le Chaise, the celebrated necropolis of Paris, and is, of course, a recent production.

There is a curious likeness in these two specimens of the stonecutter's handiwork, notwithstanding the gulf of time and space that separates the two workmen. From base to architrave one could fairly assume that the differences were but the reasonable departure from severe monotony, as executed by a single hand. But architrave and capital are so absolutely opposed to each other, and to the purpose assumed in commemoration of the dead, that a child can see that the mind that designed the one could not possibly have designed the other.

Yet in some respects the Turkish stone is the more gracefully proportioned, both in base and column, and there will be but little difference in taste in choosing the most fitting mortuary tribute, and a cursory comparison of the specimens will at once decide that the choice has been due to the overloaded ornamentation of the capital of specimen No. 1.



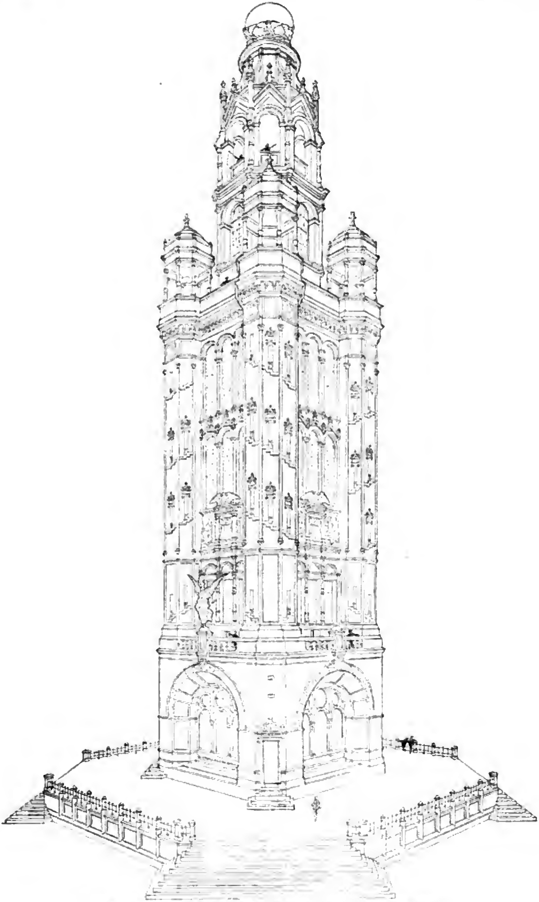


As we more closely analyses No. 1 we see an expression of gaiety in the sharp curves and exuberant fancy of the capital, and were it intended to memorialize a scene of festivity we would say that nothing could have been more happily chosen. The same analysis will also enable us to see that had No 2 been chosen to express a conception fitting a scene of festivity, it would have placed the same damper on an audience that would occur nowadays, were some one at a banquet to display at the close of the repast the coffin with the embalmed remains of his ancestor.

It is really in very little details that the difference between the fitting and *malapropos* consists, and those details, contrary to a popular opinion, that the foundations of taste in design are empirical, may be reduced to a *rationale* of well-digested principles—in fact to depend upon law. If we continue to draw from our two examples, we shall see that example No. 2 conveys a nearly perfect conception of repose, and still further examination will show that this sentiment is produced by the predominance of the horizontal line.

The gloomy religious traditions of the early Egyptians, when combined with a genius for stone-working that possibly has not since been excelled, disposed them into the use of the horizontal line, and to ignore the perpendicular line to a degree that even their palaces to the modern observer are frightfully gloomy. Yet, as we reflect that the religion of the Egyptian concentrated in the one idea of reverence for the dead, we may see why the genius of memorial sculpture has not since been enabled to free itself from the Egyptian model without introducing incongruous elements that offend even the volatile and atheistic modern with its inappropriateness in design to the sentiment to be conveyed. Perhaps the only element foreign to Egyptian models is the addition of the pediment, which is Greek, and the addition is that one touch of art that beautifies, without offending, the fitness of the conception.

American and English cemeteries are examples of misapplied design and meaningless and overloaded ornamentation. As marks for the resting place of the dead the average monument may serve, and in fact no other conception was enforced by the austere utilitarianism of modern protestantism. A growing taste for art and more etherealized conceptions, due to broader culture, is demanding more artistic and fitting tributes, and a departure from the meaningless and often fantastic designs in American memorial sculpture.



DESIGN FOR INDIANA STATE SOLDIERS AND SAILORS MONUMENT

By Henry O. Avery, 368 Fifth Avenue, New York.

BORDERS.

THE cost of carving a beautiful form is no greater than that of carving one that is ugly. There is a great deal of ugly, senseless work done for lack of interest as well as lack of opportunity. One is almost persuaded at times that ugly forms are cut in stone because they look cheaper. A nice thing, something attractive and beautiful, is often associated with expense. Now a nice thing is more a matter of thoughtfulness, more a matter if wit than money, though it often occurs that the moment one looks at something that is really nice and artistic that he at once assumes that it is expensive. As we have said there is a great deal of unattractive, homely work done because of the lack of interest or opportunity. We cannot supply the former, though in a measure we may be able to stimulate it. In the same way we may measurably add to the opportunities of those who come in contact with our work. We have here selected a number of borders from the work of Mr. Colling, which are simple, intelligent and beautiful. Now we will say to a stone-cutter that we wish a little border, or a little piece of ornament to cut on a piece of stone. It may be a gate post, a lintel over an opening, or a tombstone, or what not. It is constructed in stone and where borders may be used. Is it not better to take one of these ornaments which is the result of years of study and education in this class of work, copy it faithfully and entirely, than it is to attempt to originate something of one's own, when the study of this sort of thing is merely incidental than the sum and substance of one's life. The most atrocious of all things done in stone, and in many other ways for the matter of that, is the so-called original designs. Take the first four of the designs which we here give. Are they original? An intelligent man does not lay claim to originality in the sense as ordinarily understood in matters of this kind. The forms of which we here speak develope from one of the most primitive forms of border decorations, viz.—the zig-zag. Mr. Colling has taken this zig-zag form and formed it to what he calls the leaf bud. It is not much like a leaf bud, but that was what he had in mind. There was the zig-zag form to start with and the leaf bud is a matter of variation. The second design given is another development of the triangular form. Nos. 3 and 5 are old Byzantium forms, No. 4 is Indian, No. 7 Chinese, No. 6 again Byzantium. No 8 is a gotbic inlay which can be adapted to an ornamental border. Here is a series of triangles arranged along a stem. These, if cut in stone, would presumably be in low relief.

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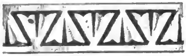

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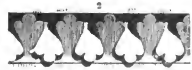

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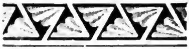

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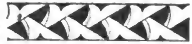

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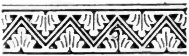

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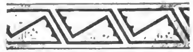

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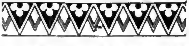

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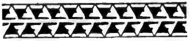

A GEOLOGICAL EPISODE.

THERE has been much discussion as to the exact time in the earth's history when the marbles and limestones of the New England states were deposited. The only way of determining this was through fossils. These fossils had been so completely destroyed by the action of the heat that it was with some considerable difficulty that they were found. During the Sixties and Seventies geology became a craze; every one took an interest in it. It was then that the age of the New England marbles was a subject of tremendous interest. Discussions were warm and learned men arrayed themselves on sides in this matter with the utmost earnestness. The matter was finally settled by a modest and obscure man, Rev. Augustus Wing. Mr. Wing was not a geologist by profession, his vocation being that of preaching and school teaching, but he was an enthusiast in geology. Being without a family dependent upon him he taught school in the winter to get the means to pursue his geological researches in the summer. Many of the older residents of Vermont remember him as a kindly old man who spent his time prying around the rock ledges of that state during weeks and days and preaching on Sunday. His researches were very successful. The long-sought fossils were found, but the world came very near never hearing of his discoveries. It was only through Mr. Billings, of Montreal, to whom Mr. Wing had sent fossils for identification, that the importance of his work was made known. Mr. Billings, realizing fully what had been done, wrote to Professor Dana of the matter. This gentleman sent to Mr. Wing for fuller information. Mr. Wing wrote a letter of sixty pages which was never sent, and partially prepared a paper for publication, but before he had finished his work he died, and what record there was in his papers and letters, were finally sent to Professor Dana. While these records were incomplete, and the location of many of the fossils discovered by him is still unknown, enough remained to decide the vexed question. That a man with information of such value should leave no complete record is to be deplored and can only be accounted for by the fact that he was waiting to make his explorations more full and complete.

THE FAMOUS QUARRIES OF WEST RUTLAND.

Probably the quarries at West Rutland, Vt., are the most famous in the country. The marble produced is much of it pure white and not far behind Italian marble in quality. The strata dips here so that in quarrying there is a sharp incline into the earth; in one quarry there being an opening into the earth for two hundred and twenty feet. The mouth of the opening in winter is covered with a wooden roof.

Near Rutland is the Dorset mountain, or as it is sometimes called, Mount Eolus. This famous mountain is composed of marble, with the exception of the top, which is of slate. It is sometimes said to be a mountain of pure marble. There is some truth in this statement though it is not possible to cut into it at all places and produce a block of commercial marble. There is mixed with the marble rock which is too hard to be worked, that which is slaty and fragile, some which contain magnesia. It is estimated that the lower part of the mountain which is made up so largely of marble is 1,970 feet in height. Above this is the cap of slate which is 498 feet thick. The mountain side is covered with debris so that it is impossible to discover its character without excavation. It is said that the first quarry was opened on this mountain in the latter part of the last century. There are now in operation a large number of quarries all over the mountain. The marble produced is of various colorings.

OUR ILLUSTRATION.

IN this month's number of STONE we give Mr. Henry O. Avery's design of the Indiana Soldiers' and Sailors' Monument. It was among the best designs presented. Mr. Avery labored under the same disadvantage as did several others of the more intelligent competitors. He failed to understand the location and the relation of the structure to the small circle park and its surroundings. This design would appear to a better advantage in a large plot with little or no elevation. But to take this design as it is, and place it in the park, it in common with many others would show that it had been merely placed there without regard to location. It is the accessories as much as anything else which have to do with the success of the design which was selected by the commissioners, that of Mr. Schmitz. There the entire park is a part of the monument. There is no separation of the structure and its immediate surroundings. It is all included as a part of the design. The monument is made to fit this particular location and is not capable of being adapted to any other. The same quality in the design of Mr. Stone gave him the second prize, while it is true that the critics employed by the commissioners said that his design was not an experiment, it is also true that he had adapted the older methods of monumental designers to this particular location, and did it with great success. Another statement in regard to Mr. Avery's design would be that it is in no sense a soldiers' monument. It tells no story along this line. There is a suggestion in his description that memorial windows could be provided for the purpose of picturing the four epochs in the history of the state, which however, does not contemplate its recent war history. Its beauty as a design for a tower goes without question.

"It is proposed to erect a memorial tower, rising from a terrace 120 feet square, to a total height, from the center of Circle Park, of 250 feet, the base being 60 feet square.

"The monument comprises two objects, one consisting of a memorial hall, on the ground floor, 40 feet square, for a museum of the most precious and most interesting relics of the war, the other including a crowning balcony and above it a belvedere at the top of tower for the purpose of giving an elevated, and unobstructed view of the city and country, access to which can be had either by stairways in the flanking towers or by an elevator in the center, beginning at second floor; the intermediate stories are utilized for the placing and exhibition of other relics and the war archives of the state; an admission fee to the structure would defray all the running expenses incurred by the state for its keeping and preservation. For safety, economy and convenience it is proposed to place a small boiler house in a corner of the park, mostly under ground, for the purpose of giving heat, steam power and furnishing artificial light.

The four epochs in the history of the state, of the occupation by the mound builders, the Indians, the French, and the English-American, to be illustrated by colored memorial windows in stained glass in the hall of relics, while the statue of the war governor is to here occupy a conspicuous place. The memorial tower as designed is 15 feet higher than the dome of the capitol."

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THE FIRST AMERICAN MARBLE QUARRY.

There is considerable doubt as to when and where the first marble quarry was opened in the country. There has been much time spent in researches in regard to the early history of marble quarrying in New England, but nothing definite as to who is entitled to the honor of the first quarry has been obtained. Perhaps one opened in Pittsford, Vermont, was the oldest. It was being worked in 1795 by Jeremiah Sheldon. This quarry is now known as the Owen quarry. There were many quarries in operation throughout New England in the early part of this century. In 1800 Philo Tomlinson was at work quarrying marble in New Milford, Conn.; many headstones bearing a date early in the century are still to be found in the graveyard at New Milford. He invented machinery for working marble which is in use to this day. Remnants of his machinery are still to be found where his first mill was located. In Alford, Mass., in 1803, Johnson & Stevens concluded a contract for furnishing marble for the city hall of New York. For this they received $1.06 per foot. Five years later they contracted for more marble for $3 per foot. The value of this marble may be estimated when it is known that after an exposure of three quarters of a century it shows no sign of crumbling or decay. The extension of the capitol at Washington is from the same region though not the same quarries. In the early part of the century much marble was produced in West Stockbridge, Mass., in fact the demand was greater than the supply. The mills were run night and day. Water power was used in sawing, though for a time steam was employed. Its use was discontinued on account of the increase in expense and water was again used. Quarrying stopped here in 1855, it having declined for some years previous to this. Competition from other quarries, principally from Vermont, caused the extinction of this industry. Vermont marble is better in quality, and could be quarried cheaper, hence the competition.

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ARCHITECTURAL SCULPTURE.

The mediæval artists saw that any statue isolated in front of an extensive plain wall, in such a climate as ours, soon put on in consequence of the wet, a much more sombre coloring than that of the wall itself; and thus, instead of standing out as a point of light upon it, became a dark and disagreeable spot. They very seldom, therefore, put statues in such a position; and in cases where it could not be avoided, they were careful to surround them with niche, canopy, and corbel, so as to receive both shelter from the weather, and the color and shadow necessary to make them stand in clear relief. It is possible to conceive that statues, placed along a bare wall and deprived of anything to provide them with a shaded background, might have some effect, because the shadow which they themselves would throw on the wall would afford some relief. But what effectiveness could anyone hope to obtain by placing solitary figures in front of a wall pierced with arches, for instance? Such statues—spotted with the damp, having no plain surface on which to throw their shadows, intersected here by a pier, there by a void—would look, when seen in perspective, like a confused mass, disagreeable and painful to the eye. This unhappy result is only too evident on the interior façades of the new buildings of the Louvre, over the portico; and we may be sure that the architecture would gain by being deprived of a decoration as inappropriate as it is costly. The execution, at least, of figures to be placed in such a situation should have been simple in the extreme, that they might thus present large plain surfaces to the light. But the artists to whom they were intrusted have not considered it necessary to submit to such conditions; and the architect, preoccupied with other cares, has not thought fit to impose them. —*Viollet-le-Duc in London Architect.*

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The Museum of Natural History, in the city of New York, has now in its possession the Jesup collection of specimens of building stones. There are in this collection 1,050 specimens, each a four-inch cube; and every quarry in the United States, which produces building-stone in any considerable quantity, is represented by at least one specimen.

TURNING AND POLISHING MARBLE IN ENGLAND.

Marble is cut with a thin plate of soft iron used as a saw, and supplied continuously with water and sharp sand. Both the hand and machine-power are used, and the cutting is carried on continuously in most marble works. The polishing is commenced by rubbing down the surface with sharp sand till it is perfectly flat. Finer sand is then gradually used, and at length emery, after which tripoli, the last polish being given with tin-putty. The coarse sand is usually rubbed on the marble with a plate of iron. The polishing rubbers are coarse linen cloth. Water is required in every stage. Having chosen a piece of marble about the size required, and free from veins, vents, etc., to which black marble is very subject, the first process is to level one face and with a pair of compasses strike a circle round the outer edge, then with a mallet and pointed chisel work it roughly to a circular form. It is then ready for the lathe, and being fastened with a resinous cement to an iron chuck, it is screwed to the lathe spindle and a very slow motion given to it. The only tool used is a bar of fine steel about 30 inches long, being three-quarters of an inch square, drawn to a point and well tempered. This is forcibly applied to the marble, which it reduces to the proper form by slowly spelching off small pieces. After the correct outline is acquired with this tool, it is ready for the grinding process, the first being to apply a piece of coarse and hard sandstone with water (the lathe now having a rapid motion), until all the toolmarks are ground out. A finer piece of sandstone is then used to remove the coarse scratches of the previous one, and so on with a few other and still finer stones, until all the scratches are quite obliterated. This prepares it for polishing. A piece of cotton cloth, washed quite clean and well rubbed with flour emery, is applied to the marble and polishes it to a certain extent. A similar piece of cloth is then rubbed over with putty powder (white oxide of tin), which gives a very high polish. This is the method, with a few trifling variations, by which all kinds of marble are turned and polished. Fluor spar undergoes nearly the same process, but requires much greater skill on the part of the workman, as the spar, being composed of a mass of crystals, whose cleavage is in various directions, requires a more delicate manipulation than almost any other stone. Alabaster is a soft stone and can be sawn with a common tooth-saw, and is turned and polished in a very similar manner to marble—*J. T. Hall, in London Architect.*

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A NOTABLE QUARRY.

The quarry at Sutherland Falls, Vt., is a most beautiful sight, one which will repay a trip of many miles. The quarry is a hollow cube cut into a hill with perpendicular walls rising a hundred feet. The floor is of solid marble, an acre in extent, over which run the channeling machines. Marble from this quarry is clouded or mottled. There are sixty-two gangs of saws in operation day and night. Much of the marble is finished in shops near the quarry and the demand for finished marble has increased so much that additional shops are now being erected.

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"Who was Peter?" asked a Sunday-school teacher.

"Peter was a brick."

"Why, Johnny, I am surprised at you."

"It says so in the Bible anyhow. I read it the other day. It says; 'Thou art Peter, and upon this brick I'll build my church.'"

"Rock, Johnny, rock; not brick."

"Well, I knew it was some kind of a building material."—*Texas Siftings.*

CORRESPONDENCE.

CORRESPOND WITH US!

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

[Regular Correspondence.]

From Chicago.

Business in the Convention City is not particularly rushing just at present, especially in the stone line; were the stone men of the city engaged in the hotel or "wet goods" line, they would undoubtedly find the season of 1888 far more profitable from a monetary point than they will by selling or cutting stone.

To be sure, there is a certain number of contracts being awarded all the time, but when one takes into consideration the fact, that there are between fifty and sixty different firms to be satisfied and that each is "hungry" for a job, in order as they say "to keep their mills going" and are willing to take work for almost any price for this reason, it will be readily seen that there is small profit in it for anybody.

Why any man, in his right senses, is willing and anxious to take work for a price that he knows is less than he can do it for, merely for the purpose of keeping his mill going, is something that even the initiated cannot understand.

It would appear to a rational person, that it would be more profitable for him to shut down and wait until prices had righted themselves, as they certainly will, in their own good time, but he does not think of this but keeps plodding along, and keeps his machinery running at a loss in order that he may not appear to have less work than his neighbor.

The building boom has not developed as was expected, owing probably to the excitement and uncertainty of presidential election and the aversion of the people to make any sudden political changes in the character of the government. However, there certainly is some reason that may develop itself later on in the season, and explain the reason why the stone men are not coining money, instead of barely paying expenses.

The City Government in conjunction with the various railroads entering the city will build quite a number of viaducts over the principal thoroughfares, not already protected in this manner; several have already been let, and others are now under way and will soon be advertised for proposals. The principal stone used in the piers and abutments is Joliet or Lemont limestone, which is generally capped off with buff Bedford coping and bridge seats.

The largest buildings that will be erected here this year, from present indications, are the Wirt D. Walker building on the northeast corner of La Salle and Madison-sts. which will be twelve stories and basement high, and will be constructed almost entirely of brick and terra cotta; this latter is a very foolish idea as any person can attest who will merely walk around any section of this city and observe the brick buildings that have been erected only in the last few years; he will very soon become tired of brick and terra cotta when he sees the dingy, faded appearance of brick, to say nothing of the streaks and "splatches" of white saltpeter that keep continually coming to the surface.

F. P. Owing's building to be erected on the corner of Adams and Dearborn-sts. will also be very large and attractive, being fourteen stories high and having a peaked gable roof that embraces several stories and a corner tower. The cost will be in the neighborhood of $500,000.

Plans are being made to remodel and add eight stories to the Old Board of Trade building, which will add another large office building to this district.

Monument dealers report that business is very good, with the prospect of its being better during the fall of the year.

The Haymarket Monument Committee appointed to select a design for a monument to commemorate the Haymarket Massacre, have thrown aside all the designs, including those that were awarded prizes, and have followed the example of the Indianapolis commissioners and selected a man, who was so well acquainted with American ideas of art, that he could not speak the English language, to make a design to suit them.

The large office building that was to have been erected on the corner of Monroe and La Salle-sts. by Marshall Field, and the foundations of which have been weathered for several years, owing to expensive litigation relating to the damages to adjoining property, will probably be started this summer as Mr. Field has decided to build on his own ground, and not to use the party wall of the building on the west.

It is a curious commentary upon American patriotism that while this country is teeming with genius of all kinds, not particularly belonging to native born citizens, but of those aliens who have been here long enough to be naturalized, it should be found necessary to import a foreigner to do every little piece of work that is in a small way out of the ordinary path. Let us have a change, and let the stone men of the country lift up their voices and denounce any insult to home industries or talent.

The death is announced of Chas. K. Proctor, a well-known stone contractor of this city.

Sets a Good Example.

To the Editor of Stone

Sir: I am in receipt of your valuable paper and it comes up to my utmost expectations. It is just the thing for which it is intended. I shall from time to time write from my 19 years' experience in the stone business which may be interesting to some. There are many valuable treasures still hidden in Mother Earth which would be worth millions if developed. I will give you a short history of one near here.

About six miles north of Platteville there is a belt of sandstone which most geologists consider a part of the St. Peter belt, but of a strange formation. It starts about 100 feet wide and runs in a northeasterly direction for nearly two miles. The peculiarity of it is in the way in which it lays. It looks as if it might have been put there by some human power as was the great wall of China. It is a great natural curiosity. My first acquaintance with it as a useful material for building purposes was five years ago, when I took a contract to put in some bridge abutments and got it at good figures, as everybody supposed that stone was so hard it could not be worked. But as I had had some experience in working the St. Peter when it was frozen, I tackled it for my bridge work, and it worked like a charm. I built two abutments of it and cleared about $150 in twenty days, and for that class of work it is very durable.

It has always been very difficult for our blast furnaces to get a material to line their hearths, the intense heat melting down the ordinary sandstone like a snowball. Our smelter was complaining that there was no stone that would stand the heat. I told him I had a stone which I thought would stand all the heat that coke could give, and he came down to my yard where I had a pair of gate-posts cut from this stone and looked at it. After examining it, he made a contract for a trial order and the lining has stood most wonderful. As for grit it really is the only grit I know of that will take hold of the polished face of Quincy granite and cut like marble. A marble agent, formerly of Davidson & Sons, of Milwaukee, was here in May, and I showed him a sample of it, and he said he had never seen anything like it.

Next month I will give you an account of a stone that is produced at Mazomanie a fine freestone, similar in texture to the Bedford, and a quarry of the same stone as white as snow three miles west of Muscoda.

Yours truly, Edgar Ray.

Platteville, Wis., June 18.

Granite in Connecticut.

To the Editor of Stone.

Sir: The May number of Stone came to hand some time ago. Should have acknowledged receipt sooner, but have taken time to examine the journal and am much pleased with it. Perhaps a short notice of the stone business in this vicinity may be interesting to some of your readers.

Mystic, on the Mystic river, is about half way between the extensive granite quarries at Westerly, R. I., and Groton, Conn., on the Shore Line railroad and was widely known 25 years ago for its ship-building industries.

Within the last two years excitement has been high here by reason of the discovery and opening of several granite quarries. Some of them have been abandoned, and others are now being worked by parties from Westerly and Groton, who are shipping stone to New Haven, Conn., Quincy, Mass. and to New York and Brooklyn. The stone is very near like the Westerly granite and in color and texture, being very fine, and some of the quarries are very dark and others are quite light colored. Some of the best quarries are about three or four miles from the railroad and river, consequently the teaming is thought to be too expensive and they are not being worked. One of these quarries is a very fine pink colored granite, and will no doubt be valuable some day.

The Silex works here have lately taken quite a boom, as the mills here in the village and the mines at Lantern Hill, have lately been sold to a company with abundant means, who are putting in new mills, building a new dock and enlarging the business generally. A survey has been made, and ties are being cut for a railroad from the mines to the mills, a distance of about eight or ten miles being a gradual down-hill grade. At present the quartz is hauled by heavy four-horse teams. This new railroad will let out some of the inland granite quarries. L. W. C.

Mystic Bridge, Conn., June 28.

He at Once Subscribed.

To the Editor of Stone.

Sir: Some time ago I received a circular of a paper you proposed publishing, called Stone to be issued May 1. From the prospectus I should think it would be a paper that would have a large circulation, and one that is needed in the stone business and architecture. I would like a sample copy of the paper, think I would like to subscribe for it. I have been taking a publication called the ——— but that does not fill the bill of what I want, but think Stone will.

Our people on the coast are just beginning to realize that stone is what is needed in building. We have some excellent quarries and it is to be hoped that stone will come into general use here. I have two quarries of very fine sand and freestone working and a very large ledge of diabase a species of granite commonly called syenite, of dark green mottled color, with fine crystals of hornblende. From one of my quarries of sandstone I made the memorial stone for the Washington Monument, donated by the state of Oregon. So you see I am somewhat interested in the stone business and see the need of a journal devoted to that interest. Hoping to receive a copy of the paper soon. I am yours truly, Frank Wood.

Albany, Oregon, June 2

Struck a Keynote.

To the Editor of Stone

Sir: In your article, "Incomplete Information" you have struck a keynote, that is worthy of serious consideration, and accounts for much failure in our line of business, as well as any other. For instance, a job is figured up to cost say $500 all set up, the stone-dealer gets $600 from his customer. He says, "That makes $100 clear for me," and just there is the mistake made, in taking no account of other incidental expenses, risks, personal service, etc.

Inclosed pleased find check for $2 for one year's subscription commencing with your sample number. We hope you will make a success of it and would say that I am well pleased with the May number. Wishing that your shadow may never grow less,

I am respectfully yours, John L. Dalot.

Addison, Me., May 26.

Is There Such a Machine on the Market?

To the Editor of Stone.

Sir: I wrote sometime ago in regard to a machine suitable for smoothing surfaces of flagstone. Have carefully looked over Stone, of which I am a subscriber, for something in the way of information. Is there such a machine made? What is it? What will it do, and what is its cost? I understand about those planers, but they work too slow and too exact for my purpose. Must have something to go over the stone faster. Any information very thankfully received. Yours, J. C. Barger

Goodyear's, Cayuga Co. N. Y., June 11.

CALIFORNIA MARBLE.

Within the past few years considerable quantities of marble have been discovered in California. These marbles are pronounced by experts to be of the best quality and cover in coloring a wide range. The inyo marble, found in a range of mountains of that name, appears to be the most important of recent discoveries in that state. The quarries have changed hands several times in the last two or three years, but the present owners, the Inyo Marble Co., are pushing matters in true business spirit. They have put up a mill for sawing, there being sand for this purpose found in the immediate vicinity of their quarry. The stone is a pure dolomite and varies in color. The greater part of it is pure white but there is much that is colored, this including a variety known as moss agate. Experts who have examined this marble pronounce it of a very superior quality suitable for the finest kinds of work as well as for architectural work.

In Antelope Valley, Mono county, there is an extensive bed of marble of all colors, including white and black. It takes a high polish and is believed to be of great value. Some of it resembles onyx. Blocks of any size can be quarried, some weighing as much as 25 tons having been taken out.

There has recently been discovered near Los Angeles, a deposit of marble which is said to cover 600 acres. This will prove of the greatest benefit to Los Angeles as both lumber and stone are scarce. It is calculated that this marble can be laid down there for $1 per cubic foot, and it will probably take the place of adobe which is almost exclusively used there. Lumber is the only other building material to be had and is very expensive.

There are in several parts of California, deposits of white, or statuary marble which appear to be of excellent quality. They have not been worked as yet, and their exact value is not known. On the McCloud river there is a deposit of this character, and the Pacific Carrara Marble Co., has been incorporated for some years for the purpose of developing deposits in Monterey county.

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BOOK AND PERIDODICAL REVIEW.

NOTES ON THE COMPRESSIVE RESISTANCE OF HAVERSTRAW FREESTONE, BRICK PIERS, HYDRAULIC CEMENTS, MORTARS AND CONCRETES, by Gen. Q. A. Gillmore, Engineering Corps, U. S. A. John Wiley & Sons, N. Y.

This is an octavo of 198 pages and 17 folding diagrams. The title is descriptive of the entire contents. Gen. Gillmore was in recent years the leading authority in matters relating to the strength of stone for structural purposes, at least since the publication, in the annual report for 1875, of the Chief of Engineers, U. S. Army, of his report on the "Strength of the Building Stones of the United States." In that report, he announced the law that the compressive strength of cubes of homogeneous stones vary as the cube root of the length of the edge of the specimen tested. Stated in algebraic language the law is.

$$y=a\sqrt[3]{x}=a\,x^{\frac{1}{3}}$$

in which y is the strength per square inch of bed area, a is the strength of a one-inch cube of the stone, and x is the length of the side of the cube in inches. This law was deduced from two series of experiments on cubes varying by increments of ¼ of an inch, in one series from ¼ inch to 4 inches in diameter, and in the other, from ¼ inch to 2¾ inches. The volume under review contains the results of a series of experiments undertaken to further test this law for larger sizes of cubes. The experiments before us were on cubes varying by one inch from 1 inch to 12 inches, although one of the 10-inch cubes, and all of the 12-inch cubes exceeded the capacity (800,000 pounds) of the testing machine.

In his first report Gen. Gillmore stated that it was doubtful whether this law continued up to the ordinary dimensions of building blocks, and in this report he says that "the recent tests failed to show the continuance of this law beyond small cubes." It is very much regretted that sufficient experiments were not made to determine some, at least approximate, formula for the relation between the compressive strength of small and large specimens. It seems incredible that we know practically nothing about the compressive resistance of large blocks of stone. At present, it is impossible to determine whether the ordinary practice leaves a large or small margin for safety. It is probable that, to make sure of stability, present practice is extravagantly expensive. This is a most important subject, and should receive attention in the immediate future. Since the making of these experiments would be of general benefit, and since to make them would involve so much expense that no individual or firm will undertake them for the benefit of the public, the general government should give its authority and financial aid for an extended series of experiments on the strength of masonry. At least, we hope that the officers in charge of the great testing machine at the Watertown (Mass,) Arsenal will see to it that further experiments of known reliability are accumulated, and then perhaps when the data are more numerous some valuable conclusions can be extracted from them.

Gen. Gillmore also had a few experiments made to determine the relation between the strength of cubes and prisms of a height less than their depth, but their number are so few and the variation so great that no satisfactory conclusions could be reached. This subject also should receive further attention.

Over half of the volume under review is taken up with an account of the experiments made to determine the "set," *i. e.* the permanent shortening which mortar and concrete undergo when subjected to a compressive strain, and to determine the elasticity of these materials. These are the only experiments that have ever been made on this subject. The importance of these latter investigations will appear when it is remembered that it is a rapidly-growing custom to construct the interior skeleton of all large stone or brick buildings exclusively of iron, and it is very important to know how iron and stone act together when under the immense strains to which they are subjected in the very high buildings now so common.

On the whole the book is of more interest to the scientific man than to the practical builder, but it is only by the accumulation of such data as is found in this volume that scientific rules can be formulated for the guidance of the constructor.

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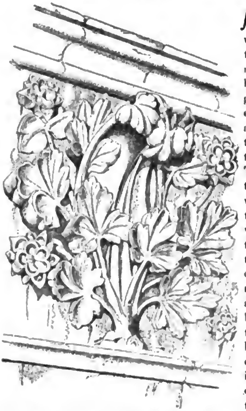
FOLIATED WORK.



A CHARMING bit of foliated work is this from the Chartres cathedral, a building begun in the beginning of the eleventh century and dedicated in the latter part of the thirteenth. The character of the moldings would indicate that this piece of work belonged to the twelfth century though the carving is more modern in appearance. It is possible, however, that the drawing is to be taken into account for this. It is true that a great deal of the work of these cathedrals, which were so long in building, is difficult to locate as to the particular period in construction. Different parts of the building were finished at different times. Then again, additions and restorations were made to particular details without regard to the original idea of those who had first to do with the work. In some cases we may have a doorway which is begun in the eleventh century, and as a part of it, details of carving or otherwise, were supplied in the thirteenth century. This makes the tracing of the period of the work difficult to find, and it often furnished occasion for dispute. But as to this piece of work, it is very attractive, bold and strong in rendering yet delicate and fine in conception. It is one of the things which is artistic because it is nice, and not nice because it is artistic. In our work of the present time about buildings and monuments there is a great deal that is used and tolerated because it has been used before. It is nice by implication. Some large man of the town, village or country said a particular thing was nice and no one ever disputed it. Finally it came to be believed, not because it was true but because some one said so and no one cared to dispute it. This thing has been repeated from time to time and is constantly getting a little worse. Here is a suggestion for something fresh, a break in the chain. One may not care to use the whole thing, possibly only a rosette like the two so plainly shown at the left, maybe a single leaf, or two or three of them grouped together make a faithful, intelligent copy.

[White's Geological Survey of Iowa.]

ROCKS AND MINERALS OF IOWA.

"IN this section are given the results of the analyses and examinations of the rocks and minerals. In many of these it was only desired to have partial analyses made, or to have an examination made for the presence of some particular element. These examinations are grouped in tabular forms, as far as possible.

Hydraulic Limestone from Waverly, Bremer County. The rock is of a light gray color, most of it being quite homogeneous apparently; but in a few places, the rock appears to be penetrated by light bands of ferruginous matter. It is very soft when fresh from the quarry; but hardens upon exposure to the atmosphere.

A number of analyses gives the following as the average composition of the rock:

Insoluble	7.42
Alumina and ferric oxyd	3.20
Calcium carbonate	49.32
Magnesium carbonate	37.59
Water, traces, and loss	2.47
Total	100,00

The insoluble matter consists of a fine white sand. The precipitate of alumina and ferric oxyd consists mainly of the former.

It was also found that a sample taken from the interior of a large piece of the rock, contained about five times the amount of water found in that part of the rock which had been exposed for some time to the air. The rock is said to succeed admirably as a hydraulic limestone.

Magnesian Limestone from Anamosa, from the quarry of Parsons & Webb. This is a gray rock, breaking into irregular fragments, and seems to have no tendency to split into laminae. It is very hard. The analyses gave:

Insoluble in acid	.72
Ferrous and ferric oxyds	.23
Calcium carbonate	57.32
Magnesium carbonate	41.21
Moisture	.31
	99.79

The percentage of insoluble matter seems too small for good hydraulic limestone, although the magnesium carbonate exists in large proportion.

Analysis of Sediment of Missouri river water. No. 1 is at low water stage; No. 2 at high:

	No. 1.	No. 2.
Insoluble	75.23	84.11
Iron and alumina	15.19	6.85
Calcium carbonate	7.51	5.45
Magnesium carbonate	1.49	2.52
Organic matter, traces and loss	.58	1.07
	100.00	100.00

For an examination of the waters at high and low stages, see section 2. The insoluble consisted of silicious, and some ferruginous and argillaceous matter.

Analyses of the Bluff Deposit. This deposit is of a light yellowish color, and appears at first sight as though it contained little else than sand. A single analysis was made of a sample from near Sioux City, and of another from Council Bluffs, numbered respectively one and five, with the following results:

	No. 1.	No. 2.
Insoluble (silicious matter)	82.15	83.55
Ferric oxyd	3.89	4.98
Alumina	.67	
Calcium carbonat	9.66	7.00
Magnesium carbonate	1.31	2.09
Moisture	1.09	1.11
Organic matter, traces and loss	1.23	1.27
	100.00	100.00

The insoluble matter consists mainly of silica. In the second analysis, the iron and alumina were not separated, the reactions showing that iron formed by far the larger part.

Rock from Gambele & Co.'s quarry, LeClaire. The rock is gray, some of the samples having a yellowish tinge. It is of moderate hardness and has a gritty feel, and somewhat of a finely crystalline structure. The analysis gave:

Insoluble	3.33
Alumina and ferric oxyd	.74
Magnesium carbonate	41.70
Calcium carbonate (by difference)	54.23
	100.00

A good building stone, and extensively used for that purpose.

"*Iowa Marble*" *from the LeGrand quarries, Marshall County.* This is a gray rock with a tinge of yellow. It is of moderate hardness, quite fine-grained, and admits of a considerable polish. It does not appear to be entirely uniform in its structure, being somewhat marked by waving lines and rings. The result of the analysis are:

Insoluble	1.71
Moisture	.59
Ferric oxyd	1.08
Calcium carbonate	75.42
Magnesium carbonate	20.96
	99.76

It is an excellent building stone.

Ferruginous Limestone from the Sub-carboniferous, at Hardin City, Hardin County. The rock is of a red to purple color, of only moderate hardness, crushing easily. Its composition is:

Insoluble	.19
Moisture	.32
Ferric oxyd	10.03
Magnesium carbonate	15.97
Calcium carbonate (by difference)	73.49
	100.00

Traces of alumina and sulphuric acid were found.

Ferruginous Rocks. The following schedule presents results of a few examinations of rocks, relative to their percentage of iron and insoluble matter:

No.	Percentage of Iron, reduced to Metallic Iron.	Percentage of Insoluble Matter.	Character of Insoluble Matter.
1.	4.06	82.67	A beautiful clean white sand
2.	50.55	18.59.	Consists partly of clean white sand and partly of light colored, argillaceous matter.
3.	5.76	47.60.	Fine argillaceous matter.
4.	47.76.	31.22.	Consists mainly of clean white sand.

No. 1 is from a gravel-bed in the bank of Mariner's creek, near Denison, Crawford county, and is a black mass, appearing almost metallic, and having pebbles of some considerable size scattered through it. A little lime is present.

No 2 is from the ferruginous bed immediately beneath, and associated with the gypsum, on Soldier Creek, Fort Dodge. The sample is very hard, and has a color varying from red to purple. A little white substance is disseminated through it. Some lime present.

No. 3 is from Summerset, Warren county; is of a purple-red color, and seems to be an aggregation of rudely cubical masses. It contains a large quantity of lime.

No. 4 is from the ferruginous deposits at Guthrie Center, Guthrie county, and is of a dark color, inclining to red. It contains only a trace of lime."

[Written for Stone.]

STRENGTH OF STONE MASONRY.

BY PROF. I. O. BAKER, OF ILLINOIS.

THE universal custom in determining the ability of stone to resist pressure is to test the compressive resistance of small cubes. The results obtained by testing small specimens of stone are very useful in determining the relative strength of different kinds of stone, but such results are of no value in determining the ultimate strength of the same stone when built into a masonry structure. The strength of a mass of masonry depends on the strength of the stone, on the size of the blocks, on the accuracy of the dressing, on the proportion of headers to stretchers, and on the strength of the mortar. A variation in any one of these items may greatly change the strength of the masonry.

The importance of the mortar as affecting the strength of masonry to resist direct compression is generally overlooked. The mortar acts as a cushion between the blocks of stone, and if it has insufficient strength it will squeeze out laterly and cause a tensile strain; therefore, weak mortar causes the stone to fail by tension instead of by compression. Stone is several times stronger to resist compression than tension, and hence, where great strength is required it is necessary that the mortar should be of the best.

No experiments have ever been made, for obvious reasons, upon the strength of stone masonry under the conditions actually occurring in masonry structures; but experiments made upon brick piers 12 inches square and from 2 to 10 feet high, laid in mortar composed of one volume Portland cement and two sand, show that the strength per square inch of the masonry is only about one-sixth of the strength of the brick. An increase of 50 per cent. in the strength of the brick produced no appreciable effect on the strength of the masonry; but the substitution of cement mortar—1 part Portland cement and 2 parts sand—for lime mortar—1 part lime and 3 parts sand—increased the strength of the masonry 70 per cent. The method of failure of these piers indicates that the mortar squeezed out of the joints and caused the brick to fail by tension. Since the mortar is the weakest element, the less mortar used the stronger the wall; therefore the thinner the joints and the larger the blocks, the stronger the masonry, provided the surfaces of the stone do not come in contact.

It is generally stated that the working strain on stone masonry should not exceed one-twentieth to one-tenth of the strength of the stone; but it is clear, from the experiments on brick piers referred to above, that the strength of the masonry depends on the strength of the stone only in a remote degree.

In a general way, it may be said that the results obtained by testing small cubes may vary 50 per cent. from each other, or say 25 per cent. from the mean, owing to undetected differences in the material, cutting, and manner of applying the pressure; and also that stones crack at half of their ultimate crushing strength. Hence, when the greatest care possible is exercised in selecting and bedding the stone, the safe working strength of the stone alone should not be regarded as *more* than one-fourth to three-eighths of the ultimate strength. A further allowance, depending upon the kind of structure, the quality of mortar, the closeness of the joints, etc., should be made to secure safety. Experiments upon comparatively large specimens are but little help in deciding this question; the only way is to determine the load carried by actual structures. The following are the greatest loads carried by stone masonry that were discovered by an extended search through engineering literature.

Early builders used much more massive masonry, proportional to the load to be carried, than is customary at present; experience and experiments have shown that such great strength is unnecessary. The load on the monolithic piers supporting the large churches in Europe does not exceed 30 tons per square foot, (420 pounds per square inch) or about one-thirtieth of the ultimate strength of the stone alone. The stone-arch bridge of 140 feet span at Pont-y-tu-Prydd, over the Toff, in France, erected in 1750, is supposed to have a pressure of 20.7 tons per square foot (290 per square inch) on hard limestone rubble masonry laid in lime mortar. A former bridge at the same place failed with 64 tons per square foot. Rennie subjected good hard limestone rubble in columns 4 feet square to 22 tons per square foot, (300 pounds per square inch.) The granite piers of the Saltash bridge, (England) sustains a pressure of 9 tons per square foot (125 pounds per square inch.)

The maximum pressure on the granite masonry of the Brooklyn bridge is about 28½ tons per square foot (about 400 pounds per square inch); the maximum pressure on the limestone masonry is about 10 tons per square foot (125 pounds per square inch.) The face stones ranged in cubical contents from 1⅓ to 5 cubic yards; the stones of the granite backing averaged about 1⅓ cubic yards, and of the limestone about 1¼ cubic yards per pier. The mortar was 1 volume of Rosendale cement and 2 of sand. The stones were rough axed or pointed to half-inch bed-joints, and half-inch vertical face-joints. These towers are very fine examples of the masons' art.

The pressure on the limestone piers of the St. Louis bridge, was, before completion, 38 tons (527 pounds); after completion the pressure was 19 tons (273 pounds) on the piers and 15 tons (198 pounds) on the abutments. The limestone masonry in the towers of the Niagara suspension bridge failed under 36 tons per square foot, and were taken down; however the masonry was not executed.

At the South Street bridge, Philadelphia, the pressure on the rubble masonry in the pneumatic piles is 15.7 tons per square foot (220 pounds) at the bottom and 12 tons at the top; this is unusually heavy, but there are no signs of weakness. The maximum pressure on the rubble masonry and cement mortar of some of the large masonry dams is from 11 to 14 tons per square foot. The proposed Quaker Bridge dam, which is to impound water for New York City, and which is the largest in the world, is designed for a maximum pressure of 16⅔ tons per square foot on massive rubble masonry in best hydraulic cement mortar.

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COMPOUND FOR PATCHING STONE.

The restoration of some of the most important stone structures in Paris has been mainly accomplished by means of a metallic cement invented by Professor Brune. It consists of a powder and a liquid, the first composed of two parts by weight of oxide of zinc, two of crushed limestone of a hard nature, and one of crushed grit, the whole intimately mixed and ground, ochre in suitable proportions being added as a coloring matter. The liquid employed consists of a saturated solution of zinc in commercial hydrochloric acid, to which is added a part by weight of hydrochlorate of ammonia, equal to one-sixth that of the dissolved zinc, and this liquid is diluted with two-thirds of its bulk of water. In using the cement, one pound of the powder is mixed with two and a half pints of the liquid. The cement hardens very quickly and is of great strength.

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To clean marble from discoloration try two parts sodium carbonate, one part of pumice-stone and one part of finely powdered chalk. Mix into a fine paste with water. Rub this over the marble, and the stains will be removed; then wash with soap and water.

ANCIENT EGYPTIAN ART.

THE fathers of the Egyptian race appear to have migrated from the cradle of the human family in Anterior Asia, and to have subdued the original inhabitants of the Nile valley. They seemed to have been of a serious, temperate and not over-sensuous disposition, and were thus preserved from that voluptuousness which proved the downfall of all the Asiatic empires. They were, of course, under a despotic form of government, the only form under which such mighty works as the pyramids, temples and other gigantic structures with which the country abounds could ever have been executed. But great and all but absolute as was the power of the despot, it was considerably restrained by the priestly class, which was the sole depositary of all the skill and learning of those days, and which made very considerable advances in geometrical and astronomical science. Their religious views, like those of all ancient races, except the Hebrews, were polytheistic, and animals of almost all kinds received special adoration, and their bodies were embalmed at death. They were believers in a continued existence after death, and to this belief was due their marked reverence for tombs, and the peculiar care bestowed upon the embalment of the dead. They employed three kinds of writing—the hieroglyphic, the hieratic and the demotic. In the first of these everything was represented by symbols; the second was that employed by the priests, while the third was used for general business purposes.

As early as 4,000 years before the Christian era the first kingdom in Lower Egypt existed, the capital of it being Memphis. For a long time almost the only source of information about Egypt was the book on that country written by the Greek traveler and historian, Herodotus, who is known as the "Father of History," but in the modern times the hieroglyphics, or sacred carvings, have been deciphered by enthusiastic scholars, and from their researches, combined with some scattered allusions in the earlier books of the Bible, our information is derived. The successions of ruling families are called "dynasties," and of these scholars have enumerated thirty-one. The oldest monuments in the world are the pyramids of Memphis, the first of which may be dated at least 4,000 years B. C. The great skill shown in handling masses of stone and the wonderful knowledge of the building art displayed proved these to be the result of lengthened labor and practice in architectural construction. The largest pyramid is estimated to contain 74,000,000 cubic feet and incloses a sepulchre to which admission is obtained by the most cunningly devised passages, which are secured from the vast superincumbent pressure by clever constructional contrivances. They were built, as is seen from some unfinished ones, in terraces to the top and then the spaces were filled up in the reverse order from top to bottom, so as to form the regular pyramidal figure. They are constructed of stone, of which great quantities were obtainable, and of bricks, to make the necessary number of which the forced labor of subject races was employed. We learn from the book of Genesis that the making of bricks formed the most toilsome part of the compulsory service exacted by the Pharaohs from the early Israelites, who groaned under the bondage of their task-masters. The three great pyramids are near the modern city of Cairo, and are known by the names of the kings in whose reigns they were built—Chufu, Shafra and Mencheres. Of these the pyramid of Chufa is the largest, having a square base of 764 feet and a height of 480 feet; but the second appears to be the oldest of the three. The third is considerably smaller, as it measures only 354 feet square and is 218 feet in height, but it is far more beautifully and carefully executed than the others. Near these three stupendous structures is the Sphinx colossus, a lion's body with a human head, a combination the striking nature of which cannot be denied. It is now almost entirely hidden by the drifting sand of the desert, but it is 60 feet high, 140 feet long, and remains to this day as a marvelous example of skillful carving in stone and of the power which the despotic monarchs of that day had over their subjects. The pyramids were the tombs of the monarchs, and towered above the tombs of mere private persons as much as the monarchs themselves in life had towered above the rest of the nation.

The twelfth dynasty is marked by a great obelisk at Heliopolis, or the sun city. This form of pillar, rising from a broad base and gradually narrowing to a point at the top, is peculiar to Egyptian architecture. All the surfaces of the obelisks were elaborately adorned with hieroglyphics. One of the most famous of these pillars is the one known as "Cleopatra's Needle," which was recently presented to the British Government by the Khedive of Egypt, and which now stands upon the Thames embankment in London. To this period also belongs the tomb of Beni-Hassan, in which we first find a regular columnar structure, based partly upon the forms of plants, the shaft of the column consisting of the stalks of the papyrus or lotus plant, above which rises a capital representing a closed flower. In some of the larger columns of the great temple of Karnak this idea is still further developed, and we find capitals representing an open lotus calyx, above which the smaller square plinth usual in other columns was retained. These devices were afterward much embellished and varied, but then the stereotyped forms were never departed from. And it is adherence to set types throughout thousands of specimens that Egyptian architecture and sculpture showed their real lack of inherent vitality and their incapacity for organic development.

About 2,000 years before Christ conquerors burst in upon Egypt from Asia and drove back the Pharaohs to Upper Egypt. These newcomers were called the Hykoos, or Shepherd Kings, and it is supposed that the kings of Egypt, who are mentioned in the book of Genesis, belonged to this dynasty. Of what race they were is not certain, but it is not improbable that they were Arabs. The original inhabitants never ceased to struggle against the new dynasty though it was 600 years before the "Shepherds" or "Strangers" were finally expelled. They became additionally odious to the Egyptians by displacing their old deities and introducing sun worship, and their tyranny rendered the name of shepherd ever afterward hateful. In 1400 B. C. the new united kingdom of Upper and Lower Egypt arose, and Thebes, called the hundred gated, became its capital. The Pharaohs, restored to their ancient dignity and power, reveled once more in the construction of stupendous works, and the "golden age" of Egyptian art was the period between the sixteenth and the end of the thirteenth centuries, B. C. Among the ruins of Thebes the temple of Karnak stands out pre-eminent. It was 330 feet broad and more than 1,130 feet long. It was built, as was usual, on the banks of the Nile on an enormous brick terrace, and was surrounded by strong walls adorned with the most elaborate hieroglyphics, representing for the most part the gods and kings. To the vast inclosure there was a single narrow entrance between two towers. After entering the visitor passed between two rows of massive sphinxes, or combinations of various animal forms, such as the body of a lion with a head of a man, of a ram, or of a bird. The entrance to the first court of the temple was guarded by mighty obelisks or gigantic statues, the court itself being inclosed by stone corridors opening to the court with colonnades. Sometimes there was a second court of similar construction to be traversed before the entrance was obtained to the temple. The ceiling of the temple itself was of stone, and was supported on great columns, the two middle ones being of greater height than the rest, and thus supporting a higher ceiling, forming a lofty central nave, the side walls of which were pierced with numerous openings for light. To this hall were attached many apartments of different sizes, the innermost of them being the one in which in darkness was enthroned the god. The ceilings, pillars and walls were covered with mysterious carvings representing the religious, daily and military life of the people, and often brightly colored in red, yellow, blue and black. The great hall at Karnak was built by King Selki, or Selkos, of the nineteenth dynasty, who made great conquests, which are recorded on the many splendid monuments which were erected during his reign in all parts of the country. In one of his victories he killed with his own hand the enemy's chief, and this valorous act is spiritedly shown in the sculptures. He was assisted in his labors by his son Rameses II, whose tomb is in the Valley of the Kings at Thebes, and in the beauty of its sculptures and the richness of its color excels the rest of these wondrous structures. The reigns of Selki and Rameses mark the culminating point of Egyptian art, the style and finish of the carving, the minute and elaborate details of the obelisks and the grace of the figures being nowhere else equaled in the Nile valley. In the reign of Rameses was built the Memnonium, which is said to be the best proportioned building in Egypt, this being a quality not much observable in the monuments of this country. Near it was a colossal statue of Rameses in red granite, which was unrivaled both for size and beauty of execution. It now lies broken to fragments amid the ruins of the temple over which it once towered. It is for this king that the Hebrews are supposed to have built the treasure cities of Pithom and Raamses. Numerous granite obelisks bear his name, and even Ethiopia was enriched with monuments by him. He also constructed a canal from the river Nile to the Red sea, which, having fallen into some disuse, was afterward reopened by later sovereigns; and with a view to protect the peasants and their crops from the attacks of Arabs, he built a wall at the edge of the cultivated land, the remains of which are still to be seen, and are called the "old man's dyke" or "old woman's dyke." A small body of soldiers served to guard this wall, and thus to protect the farmers.

The hieroglyphics of this reign give us an insight into the manner of attacking towns usual in those days. Scaling ladders and "testudines" were used, the latter being wicker frameworks supported on poles, which served to screen a number of the besiegers from the missiles of the besieged while they mined the walls of the town. While the miners were engaged in their work their comrades were sending showers of arrows at the defenders on the wall and striving to break the gates of the town with axes. Sometimes fortified towns were surrounded by a triple wall, so that the besieged when driven from the outer rampart might retire behind the protection of a second or a third successively.

In the twentieth dynasty Egyptian art began to show symptoms of decline, though the works are still executed with much finish and care. In the twenty-second dynasty comes Sheshenk, who is called in the Bible Shishak, and who was a contemporary of the great Israelitish king, Solomon. During Solomon's time friendly relations seemed to have existed between the two nations, for among his very numerous consorts King Solomon had one of the daughters of this Pharaoh, who took one of the border towns of the Canaanites and gave it as a wedding present to his daughter, the wife of Solomon.

But during the reign of Solomon's successor some change of policy must have occurred, for Shishak invaded Judea and even entered the sacred city, Jerusalem, and pillaged the temple, taking away from it the gold shields which Solomon had made for the guards of the temple.

Rome was not founded until the year 734 b. c., which falls in the twenty-fourth Egyptian dynasty, thus enabling us to realize the immense antiquity of this great empire. In the twenty-sixth dynasty we first find Greek mercenaries employed by an Egyptian king, a circumstance which excited a revolt among the native troops and prevented the king from extending his conquests. It was thus that the Greeks became for the first time acquainted with the Egyptians, whose literature, philosophy and customs they began to notice, and it is to the researches and travels of the Greek historian, Herodotus, as has been said, that our first knowledge of Egypt is due.

It is quite impossible within these limits to give even a passing mention of the succeeding dynasties. Suffice it to say that national independence lasted until the thirty-first dynasty, when, thirty years before the Christian era, Egypt became a Roman province, having enjoyed a longer lease of national greatness and liberty than fell to any other of the early empires of the world.—*San Francisco Chronicle.*

SOUTHERN MARBLE.

Space will not allow me to say anything definite about the marble deposits which extend through these wonderfully endowed states, Georgia, Alabama and Tennessee, and embrace almost every variety of marble. In passing by the furnaces of Anniston the attention of our party was attracted by a pile of broken marble of singular whiteness, pieces of which bore such an appearance of polish as to create the impression that they were fragments of a manufactured article. This, however, was not the case. They had been brought there to be used as flux. The quarry from which they had been taken was the one selected to furnish the block of marble Alabama was to contribute to the Washington monument. When it had been finished and properly inscribed the block was forwarded and received by the builders of the monument, and having been scrutinized and submitted to the judgment of the experts, was returned with a communication stating that the law required the stone from each state to be a specimen from its own resources, and that Alabama had sent a block of Italian marble. So firm was this conviction that it required the certificates upon honor of the then governor of the state, of senators and members of Congress, and the affidavits of parties connected with the quarry, to convince the experts who had the erection of the monument in charge that it was not Italian but Alabama marble.—*Judge Kelly in the Manufacturers' Record.*

DOCTORS DIFFER.

The quarries of Rutland furnish marble of exceedingly delicate texture and purity of whiteness, and the blocks are large and sound, and quite as beautiful as the statuary marble of Carrara. The objections to it are that it is harder and more brittle than the foreign. These defects will probably diminish as the stone is obtained from beneath deeper cover.—*New American Cyclopedia.*

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The stone has been thought too soft for statuary purposes, though some layers have been used with great satisfaction for this purpose. At the state house at Montpelier may be seen the statue of Ethan Allen, of heroic size. This statue was cut by Larkin J. Mead and appropriately from Vermont marble, the quarry at West Rutland furnishing the stock. While, from its softness, the marble at these quarries cannot carry as fine lines as the Italian, still it stands exposure to the weather better. The layers are growing harder as they are followed into the earth, and some of them are about as hard as the foreign.—*The Marble Border of Western New England.*

WHAT IS MARBLE?

AT various times during the history of the earth there has been deposited, either in fresh water lakes or in the ocean, immense quantities of carbonate of lime. The deposits are the result of animal life, being mostly made up of particles, many of which remain as fossils to show the origin of the rock. Commercially, any limestone which is susceptible of a high polish, and can be obtained in large blocks, is known as marble. But strictly speaking, marble is a limestone which has been changed by the action of heat, water and pressure, so that it is a chrystalline structure. It is this marble proper which will be considered here. In most marble, heat has destroyed all fossils, but in others they remain to give us a hint of the period in the earth's history when the stone was deposited. The marbles of Carrara show no fossils, they being even in structure and grain, and are more valuable on this account.

There are two ways in which limestone has been changed to marble. After many deposits had been made on the earth's surface, the heated material below broke through to the surface in many places in great fissures called dikes. These vary from a few inches to a hundred feet in width and often extend over the country for miles. The rock on either side of these dikes is always found to have been changed from the heat of the mass which filled them. Sometimes this change is noticeable for only a few feet, and sometimes in extent for many yards. Coal is found changed into anthracite, or coke; impure sandstone into a speckled rock, resembling gneiss; limestone and chalk into marble, and clay into porcelain jasper.

But in cases where rocks, in areas extending over many miles have been changed, we see no evidences of heat sufficient to have caused this change. There are found in such rock metals which would not stand great heat without change. For instance we find carbon in contact with magnetic iron ore, though it is known that at a red heat this contact would cause the reduction of the iron ore. The cause of this change in rocks extending over thousands of miles and thousands of feet in thickness was long sought. It is only recently that experiments have demonstrated that rock under pressure, when water even in small quantities is present, will become pasty or melted and when cooled the product is about the same as the changed rock to which we refer. Carbonate of lime becomes a fairly good marble. This, then, is the explanation of the production of the large areas of marble which we find.

What we can perform in our laboratories nature accomplishes in a gigantic scale in hers. The strata above furnished the pressure, the water included in the limestone was sufficient and the interior heat of the earth gave the required temperature for the reduction of the stone to a pasty condition. When this mass cooled it chrystallized and became marble. At times the upheaval of parts of the surface increased the heat through the friction of the parts.

When the limestone was pure the result was a clear white marble such as is found in Carrara and in Vermont. Where other substances were contained in the limestone we find veined marble. Iron gives us red coloring, copper green, etc. There are many classifications made of marble but the following is simple and comprehensive and for these reasons is more valuable than one more elaborate. We make four divisions.

1. Simple or single-colored marbles.

2. The variagated marbles. These include those which are variously veined, spotted and shaded, and are among the most beautiful colored marbles known. Those which come from California are among the best found in this country.

3. Breccia marbles are those which are formed of angular pieces of different colors cemented together. These are found in different places in this country. That which comes from Maryland, on the Potomac river near the Point of Rocks, is the best known. The columns in the old House of Representatives in Washington being made from it. Quarries of this marble are found in Northern Vermont and Tennessee, the product of which is extremely beautiful.

4. Fossiliferous or shell marbles are those which contain shells. Sometimes these shells are so crowded upon each other as to compose almost the whole mass of the stone; sometimes single shells are found scattered at wide intervals through the stone. This marble is found in New York and throughout portions of the Western states.

White, or statuary marble, is the most valuable and was, until recently, obtained almost exclusively in Carrara, Italy. There is now found in Vermont a marble which in color and fineness of grain equals that from Italy. However, the Vermont marble is not so valuable for statuary use on account of being harder and more brittle than that from Italy. It is thought that when the quarries have been worked longer and the marble is obtained lower down, that marble softer and less brittle will be obtained. For statuary use it is desirable that the stone should be soft when first quarried and should harden on exposure. This is the case with that from Carrara.

As to the durability of marble in this country, there is little to be said. There have been some fairly exhaustive tests made by the Government, but an artificial test will not compare with the test of time. There has been no opportunity here to know what marble will do when exposed to our climate for many years. In the artificial tests marble from a quarry in Massachusetts was found to endure a pressure of 23,917 pounds to the square inch.

Where it was frozen and thawed fifty times the exfoliation was found to be only one ten thousandth part of an inch. This would show that if the weather caused no greater disturbance than did the artificial freezing that the wear from this cause would be one inch in 10,000 years if it were frozen fifty times a year. Probably nothing but actual experience will prove the lasting qualities of our best marbles. Some of the poorer ones have already been found unsatisfactory for exterior use, while they possess great value for interior decorations.

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FOOD OF THE STONE AGE.

What food the pre-historic people of the Stone Age in Europe ate in their day, several thousand years ago, has been ascertained in a novel way. An Englishman took the teeth of a human being of that age, which had been found in recent years, and examined what he found imprisoned in the dental tartar. After using dilute hydrochloric acid, he examined the sediment, and found portions of the husks, spiral vessels from vegetables, husks of starch, the point of a fish's tooth, a conglomeration of oval cells, probably of fruits, barblets of feathers, portions of wool, epithelial scales, fragments of cartilage and other organic remains. That these particles of food of a remote age should be preserved for several thousand years and at last recognized, comes very near the marvelous.—*Good Housekeeping.*

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Artificial pumice-stone is now prepared by moulding and baking a mixture of white sand, feldspar and fireclay. This product is said to have superseded the natural stone in Germany and Austria.

For cement to make joints for granite monuments use clean sand, twenty parts; litharge, two parts; quicklime, one part; and linseed oil sufficient to form a thin paste.

MOSAIC WORK.

CAP—13th CENTURY.

THE modern workers in Mosaic use at present the black marble of Farran, of Lalal, the deep black of Argueil, of Ponilly, and of St. Cyr, in the suburbs of Lyon. For blended tints, the ancient mosaists employed the marbles of Florence, which are found near the Arno, and which in general are of an olive, dead-leaf color, umber and wood shades; they also used different tinted flints, reddish violet and brown. It must be admitted that in lapidary paintings, above all in portraits, nothing can better render the mellowness and transparency of reflex in the shade which oil paintings give us, particularly when the brilliancy is enhanced by the glow of vitrified pastes. M. Belloni has profited by these resources so well in his mosaic of the "Car of Victory," that one must be forewarned to know that it is a lapidary painting.

The mosaics of the ancients are less fine and less finished than those of the moderns, but they are distinguished by a happy mixture of colors, a spirit and design which are wanting in the latter. They cut their marble in strips to form their cubes, and gave them the shape of dice. When prepared, they probably place each color in a compartment separately, as we do now.

The ancients, to collect their cubes, employed a mosaic composed of lime, the dust of marble and curdled milk or skimmed cheese, the sediment of which would form a line of the rich color given by the milk. M. Ritter, in his collection of Swiss antiquities, observes that the cement of the cubes of an Avenchon mosaic is composed of a paste of pulverized yellow stone and linseed oil. To this, litharge may also be added. When the mastic is very dry, rub it and polish it as usual, taking care to move the instrument or cushion evenly so as not to injure the cubes, which are still soft, or the mastic, which has not yet acquired its full degree of solidity. The white marbles, in particular, are softer than the others, and more apt to strike off. After a little time, warm the mosaic a little to free it from all moisture, and then finish by rubbing the whole with a cushion of cotton or soft wool, slightly moistened with linseed oil.—*French Translation.*

THE CEMETERIES OF TURKEY.

Turkish tombstones are narrowest at the base, and soon lean and topple. Many lie prostrate, making seats for the living, who are free and fearless neighbors of the dead. Some of the cemeteries are used as pleasure grounds for the soldiery; the crumbling stones mend highways, repair walls, and repeatedly I have seen a handsome slab stop a hole to keep the wind away, or serve as a doorstep to a tumble-down hut. Children play in the somber alleys, washwomen hang clothes and stretch lines on the headstones, and ladies with veils of snowdrifts and mist, drawn close by henna-stained fingers, picnic and sprinkle sweet basil, for remembrance, above the beloved who have passed from sight. There is a soft air of resignation in their manner—the virtue which Mohammed taught is the key to all happiness—and they wear no mourning. Sinful it is to show sorrow for the loss of friends. It is believed that children of over-mourning parents are driven out of Paradise and doomed to wander through space in darkness and misery, weeping as their relatives do on earth.—*Susan E. Wallace in New York World.*

OFFICIAL CALL.

To the Marble and Granite Dealers of Ohio, and to those in every State of our Union, and to our brothers and neighbors in Canada, we send a kindly greeting:

We once more remind you that our State Marble and Granite Dealers' Association will meet in Cleveland, O., July 11 and 12 next, now near at hand.

We want you each and every one, whether a member or not, to consider yourselves especially invited to attend with us on the occasion. Our aims and sole object are to better the condition of things for all, and place our trade on a better basis, both financially and socially.

We shall have a pleasant place to meet, and the resident wholesale brethren insure us they will do all in their power to make our stay in the beautiful Forest City both pleasant and profitable.

Satisfactory arrangements have been made for special hotel rates with the proprietor of the American House, No. 138 Superior Street, Cleveland, O. He has kindly tendered us the free use of commodious double parlors in which to meet, all of which we have accepted, in behalf of our Association; and we hope the brethren, in appreciation of this kindness, will stop there during our meeting, as it will bring us together, make it socially much pleasanter, and handy to our meeting place and to the central part of the city.

To our members we would say that we especially wish to call your attention to the fact that our next meeting will be the time for holding our annual election of officers for the ensuing year. We hope all may be present, either in person or by authorized proxy, as the success of our Association depends largely on its executives.

We have in former circulars said all that we feel is necessary, or our duty to say to you; now we ask you in all kindness to come meet with us, and investigate what we are trying to accomplish. Throw dull business cares aside for a few days, and take a nice little trip; it will do you good, do us good to meet you there, have a friendly hand-shake, and enjoy a grand reunion of our craftsmen.

Members of the National Marble and Granite Manufacturers' and Dealers' Association, composed of delegates appointed from the several State Associations, will bear in mind that the association will convene in Cleveland on the same dates and at the same place as our State Association, July 11 and 12 next. Do not forget the time and place, but take due notice and govern yourselves accordingly.

The board of directors will hold a meeting at 10 A. M., of the 11, at the American House to consider matters of importance to present to the association.

With many kind wishes, we remain

Fraternally yours,

HOMER M. WOODARD,
Secretary.

JAMES HARSHA,
President.

Columbus, O, June 20, 1888.

CARBO-DYNAMITE.

The latest addition to the list of high explosives is called carbo-dynamite. It is composed of ninety parts of nitro-glycerine absorbed by ten parts of a variety of carbon. The London *Iron* gives an account of some experiments with it, which seems to show that it possesses several important advantages over ordinary dynamite, among others, considerably greater power, and the generation of much less noxious vapor when exploded in confined places. It is claimed also to be entirely unaffected by water.

It is estimated that there is invested in the marble business in the states of Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Maryland and Tennessee not less than $12,000,000. Two-thirds of this is in quarries, the remainder in mills and other improvements.

New and original designs in slate mantles are being constantly put upon the market by Conlman & Westcott, Fair Haven, Vt. They have a very complete slate mill. Mr. Conlman made the first slate mantle made in Vermont.

Slate is sometimes quarried in large blocks as well as other kinds of stone. John Jones, of Castleton, Vt., a short time since took from his quarry a block of slate which contained 800 cubic feet.

PUBLISHER'S DEPARTMENT.

MATTER APPEARING UNDER THIS HEAD IS NOT THE OPINION OF THE PAPER.

THE WARDWELL STONE CHANNELING AND QUARRYING MACHINE.

A LARGELY increasing demand for stone for building and other purposes, calls for the introduction of labor-saving devices, which, while increasing the supply lowers the cost of production. To this class belongs the machines herewith illustrated and which are extensively used for quarrying throughout the country.

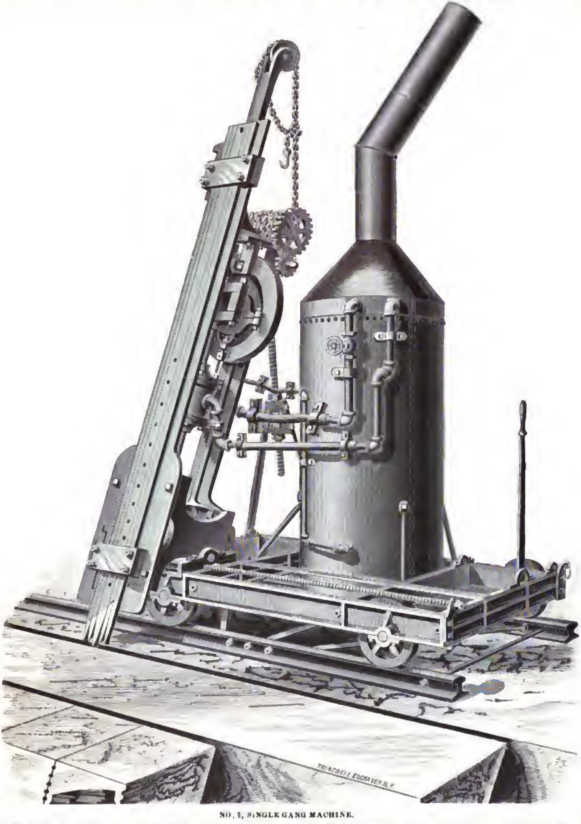
The length of double gang machine is 10 feet, and they are made of two different widths, respectively, to cut channels 4 feet 1 inch and 6 feet 7 inches apart, and cut two channels at once. Other widths if wanted made to order. The length of single gang machine is 7 feet, width 6 feet, and it cuts either vertical or inclined channels down to 45 degrees, and the cutting apparatus with its operating machinery is made adjustable for operating upon either end of machine, thereby making it a right or left-handed machine, adapted to cut in all corners. Weight of double machine 4½ tons; shipping weight, with all the fixtures, 7 tons. Weight of single machine, 2½ tons; shipping weight, with the fixtures, 5 tons. The double machine has 6-horse horizontal steel boiler and engine, and the single machine 5-horse vertical steel boiler and engine, and they are provided with patent lock-up safety valves set to carry 80 pounds of steam. The machines are supplied with 60 feet of steel rail track and a full set of tools and fixtures, and the double machines with 8 gangs and single with 4 gangs of cutters, with printed directions for operating machines. The machines are locomotive and cut moving in either direction, and are reversed without stopping, and either or both sides of double machine may be operated at pleasure. It requires two men to operate single and three to operate double machine, and the single machine uses about 300 and the double machine about 400 pounds of coal per day, and the cost of operating is about $6 for single and $8 for double per day. The single machine strikes 150 and the doulde 300 blows (150 on each side) per minute, and feed forward on the track ½ inch at each stroke, or six feet per minute, and cut from ½ to 1 inch in depth (according to the stone), each time passing over. The single machine cuts from 40 to 80 square feet of channel in marble and limestone and 80 to 100 in sandstone per day, and will do the work of 25 men. The double machine cuts from 75 to 150 square feet of channel in marble and 150 to 250 in limestone and sandstone per day, and will do the work of 50 men.

The cost of cutting channels is from 4 to 15 cents per square foot of channel. The cost, per cubic foot, for cutting channels with narrow machines, is from 2 to 5 cents, and with wide machines, from 1 to 3 cents. Channels 4 feet in depth can be cut for one-sixth and 6 feet deep for one-eighth the cost of cutting the same by hand labor. Channels are usually cut from 4 to 6 feet deep and 1¾ inches in width, except in sandstone which are 2 inches wide, and they can be cut within 3 inches of the parallel wall of a quarry, and have been cut 13 feet deep. Machines for sharp grit sandstone are made expressly for that purpose with short guides and cutters specially adapted for that stone. Each alternate tier of blocks can be cut of any desired width by placing the machine a greater or lesser distance from channels previously cut, or channels can be cut between, thus giving a great variety of sizes, even with a double machine. The channels cut are straight and true like a tooled face, and every foot of channel cut makes two feet of cut surface upon the blocks, which is worth all its cost in cutting (incidental to quarrying) in the enchanced value of the stone alone over the old process. The stone is all saved in quarrying with these machines, and the saving of stone alone over the old process, is sufficient in many quarries to cover the cost of a machine in one season. Clean, open channels can be cut with these machines for less than one-third the net cost of any other known process.

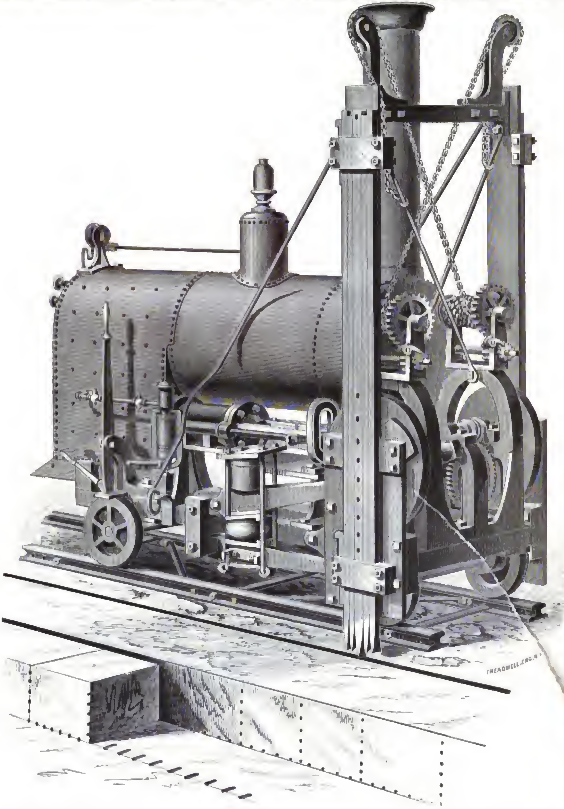
Parties using these machines can produce stone cheaper than by any other process known, and can increase their productions so as to practically meet any demand or take any contract offered and fill it promptly, and avoid all strikes, except the striking of the machine upon the stone. The machines, although high-priced in one sense, are calculated to save, in good hands, their entire cost in net earnings in one season. The double machine has cut in West Rutland marble, 200 square feet of channel in one day of 10 hours; and has averaged over 100 feet per day by the month. It has also cut 110 feet in one day of 10 hours with one side of the machine. They have cut over 350 square feet of channel in Western limestone, and over 300 feet in Western sandstone, in one day. We call particular attention to the fact that single parties have bought as high as 34 machines; others 25, 8, 6, 4, 3 and 2 each. Over three-fourths of all the marble and the greater portion of limestone and sandstone produced in the United States is quarried by these machines.

The following parties who have purchased or used these machines: Vermont Marble Co., West Rutland and Sutherland Falls, Vt. 25 machines; Sheldon & Sons, West Rutland, Vt. 3; Parker, Gilson & Dewey, West Rutland, Vt. 4; Sherman, Adams & Williams, West Rutland, Vt. 3; Manhattan Marble Co., West Rutland, Vt. 1; American Marble Co., West Rutland, Vt 1; West Rutland Marble Co., West Rutland, Vt. 2; Standard Marble Co., West Rutland, Vt. 1; Dorset Marble Co., West Rutland, Vt. 2; Esperanza Marble Co., West Rutland, Vt. 4; True Blue Marble Co., West Rutland, Vt. 4; Valido Marble Co., West Rutland, Vt. 3; A. G. Bardin, West Rutland, Vt. 1; Aldes Vondette, West Rutland, Vt. 1; Flint Brothers & Co., Central Rutland, Vt. 2; Center Rutland Marble Co., Center Rutland, Vt. 1; Hampton Falls Marble Co., Fair Haven and Orwell, Vt. 2; Paragon Marble Co., Fair Haven and Sutherland Falls, Vt 1; F. W. Smith, & Co., Pittsford, Vt. 6; Pittsford Marble Co., Pittsford, Vt. 4; North Pittsford Marble Co., Pittsford, Vt. 2; Wheaton Marble Co., Pittsford, Vt. 1; Black & White Marble Co., Pittsford, Vt. 2; Central Vermont Marble Co., Pittsford, Vt. 4; Florence & Wakefield Marble Co. Pittsford, Vt. 3; Thayer & Simonds, Brandon, Vt. 2; Corona Marble Co., Brandon, Vt. 4; L. B. Peck, & Co., Brandon, Vt. 1; Richmond Marble Co., Brandon, Vt. 3; Trojan Marble Co., Brandon, Vt. 2; S. L. Goodell & Co., Brandon, Vt. 2; Bardillo Marble Co., Brandon, Vt. 1; Neshobe Marble Co.; Brandon, Vt. 1; E. A. Morse, Sudbury, Vt. 1; Addison County Marble Co., Middlebury, Vt. 1; E. P. Fletcher, Middlebury, Vt. 1; Middlebury Marble Co., Middlebury, Vt. 2; Cutter Marble Co., Middlebury, Vt. 1; Burlington Manufacturing Co., Burlington, Vt. 3; Wakefield Variegated Marble Co., Mallett's Bay, Vt. 1; Wm. W. Kelley, South Wallingford, Vt. 1; J. K. Freedley & Son, East Dorset, Vt., and Philadelphia, Pa. 3; Samuel F. Prince & Co., Dorset, Vt., and Philadelphia, Pa. 2; Kent & Root, South Dorset, Vt. 2; Tyrel & Kent, South Dorset, Vt. 1; Hawley & Co., South Dorset, Vt. 1; F. S. Gross, Lee, Mass. 8; Matthew Freedley, West Stockbridge, Mass. 2; Henry L. Churchill, Alford, Mass. 2; Middlesex Quarry Co., (Brownstone) Portland, Conn. 2; Shaler & Hall Quarry Co., (Brownstone) Portland, Conn. 2; Alexander Maxwell, East Canaan and New York City, 2; Snow Flake Marble Co. Pleasantville, N. Y. 3; T. G. Younglove, Cohoes, N. Y. 1; Fred. W. Jones, Hudson, N. Y. 1; Empire Marble Co, Catskill, N. Y. 1; Gouverneur Marble Co., Gouverneur, N. Y. 2; Green Serpentine Marble Co., Wilmington, Del. & Dublin, Md. 1; Beaver Dam Marble Co., Baltimore and Cockeysville. Md., 8; J. F. & J. B. Connelly, Baltimore and Crockeyville, Md. 6; Maryland Marble Co., Baltimore and Cockeysville, Md. 2; Sherwood Park Marble Co., Baltimore and Cockeysville, 3; Busey, Colburn & Co., Baltimore and Cockeysville, 1; W. H. Evans, Baltimore, Md., Craigsville, Va., and Whitesburg, and Knoxville, Tenn. 4; Cleveland Stone Co., Cleveland O. 34; Haldman Stone Co., Cleveland, O. 1; Malone Stone Co., Cleveland, O. 1; Forest City Stone Co., Cleveland O. 1; Elyria Stone Co., Elyria, O. 1; H. E. Mussey & Co., Elyria, O. 1; Seesville Stone Co. Bucyrus, O. 1; New England Brownstone Co., Cromwell, Conn. 4; Williams & Johnson, Brandon, Vt. 2; John Oman, Nashville, Tenn. 1; Coral Marble Co., Craigsville, Va. 1; Hawkins County Marble Co., Rogersville, Tenn. 1; J. C. Stamps & Co., Rogersville Tenn. 2; Fulkerson, Chesnutt & Co., Rogersville, Tenn. 1; Frierson & Morgan, Knoxville, Tenn. 2; Morgan & Williams, Knoxville, Tenn. 1; Crescent Marble Co., Knoxville, Tenn. 3; Oman & Stewart, Nashville, Tenn., and Rockfield, Ky. 1; Georgia Marble Co., Tate and Atlanta, Ga. 6; United States Government, Trinity, Ala. 1; Belknap & Dumesnil Stone Co., Louisville and Memphis Junction, Ky. 3; Salem Stone & Lime Co., Louisville, Ky., and Salem, Ind 1; Peter & Burkhard, Louisville, Ky, and Bedford, Ind. 2; Chicago & Bedford Stone Co., Bedford, Ind. 4; N. C. Hinsdale & Co., Bedford, Ind. 2; Hallowell Granite Co., Bedford, Ind. 3; David Reed, Bedford, Ind., and Chicago, 3; Voris, Norton & Co., Bedford, Ind. 3; Hoosier Stone Co., Bedford, Ind. 3; Bedford Oolitic Co., Bedford, 2; Dunn, Moore & Co., Bedford and Bloomington, Ind. 1; Crim, Duncan & Co., Bedford, Ind 2; James Nicholl & Co., Harrodsburg, Ind. 2; John

Matthews & Son, Ellettsville, Ind. 1; Perry Brothers, Ellettsville, Ind. 1; Howard & Denig, Indianapolis and Spencer, Ind. 3; Indiana Oolitic Limestone Co., Stinesville and Terre Haute, Ind. 2; Terre Haute Stone Works Co., Stinesville and Terre Haute, Ind. 2; J. L. Scanlon, St. Paul, Ind. 1; W. W. Lowe, St. Paul, Ind. 2; J.M. Muller, Cincinnati, O. 1; Edwin Walker, Chicago, and Lamont, Ill. 1; Sanger & Moody, Joliet, Ill. 1; Kankakee Stone and Lime Co., Kankakee, Ill. 2; Grafton Stone Co., Grafton, Ill. 1; Robert F. Deaman, Rockville, Fulton Co., Ill. 1; Munson & Turner, Quincy, Ill. 1; Massive Stone Co., Alton, Ill. 1; Bass Island Brownstone Co., Chicago and Lake Superior, 1; Furst, Jacobs & Co., Chicago, Ill., and Lake Superior, 2; Day, Call & Co., Kaukanna, Wis. 1; Cook & Hyde, Milwaukee, Wis. 2; Bayfield Brown Stone Co., Bayfield, Wis. 2; William Knight, Bayfield, Wis. 1; J. Pickel & Bro., St. Louis and Warrenburg, Mo. 3; Bruce & Veitch, St. Louis and Warrensburg, Mo. 3; Carroll County Sandstone Co., Miami Station, Mo. 1; St. Genevieve Sandstone Co., St. Genevieve, Mo. 1; George Dugan, Kansas City, mo. 1; W.



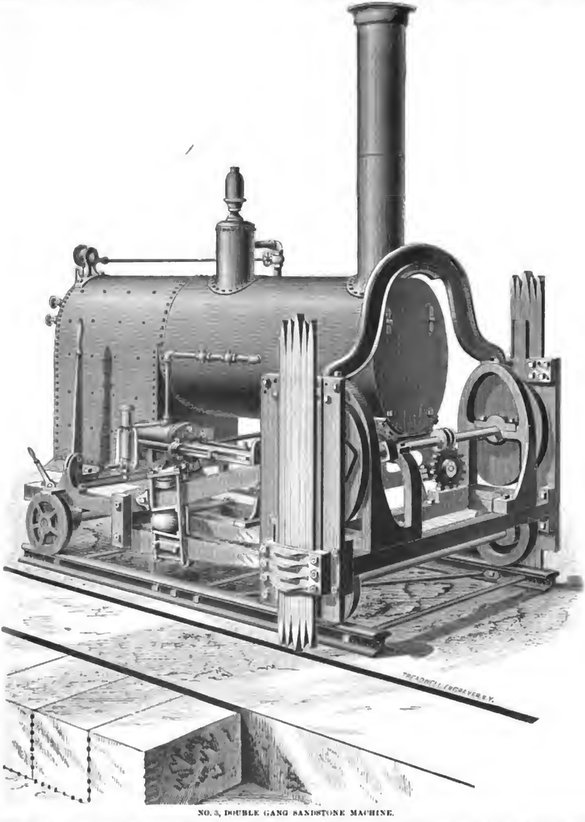
NO. 1, SINGLE GANG MACHINE.


TREADWELL ENG. N.Y.

NO 2, DOUBLE GANG MACHINE.

H. B. Stout, Lincoln, Nebraska, 1; Gus Wilke (State House Contractor,) Austin, Texas, 1; Burgher & Stevens, Honey Grove, Texas, 1; Sherbrooke Marble Co., Sherbrooke, P. Q. 1; Lobb, Dawson & Murray, St. Catherines, Ont. 1; Alfonso & Co., Matanzas, Cuba, 1; Borde & Perrer, St. Leu, France, 1; **Ashland** Brownstone Co., Bayfield, Wis. 3; F. Prentice, Washburn, Wis. 3; **Babcock** & Smith, Washburn, Wis. 1; I. J. & A. Hartley, Washburn, **Wis. 1;** Arcadian Brownstone Co., Duluth, Minn. 1; C. W. Babcock, **Kasota, Minn.** 1; Portage Redstone Co., Chicago and Lake Superior, 1; Bodenschatz & Earnshaw Stone Co., Chicago and Lemont, Ill. 1; H. Dearborn & Sons, Stone City, Iowa, 1.

These machines reduce the cost of producing block stone fully one-half, and cost of production is the main thing to consider in the present close competition in the stone business, and we call attention to **the fact that** parties using these machines have generally been very **successful and are** taking the lead in the business throughout the country. **The machines are** mostly forged iron and steel and made in the most **substantial manner, and** in the hands of skillful operators need few repairs, as the concussion from the blow is confined to the gang of cutters and completely cut off from the machine by the intervention of the compound yielding levers with rubber springs, which are connected to and operate them.


TREADWELL ENGRAVER N.Y.

NO. 3, DOUBLE GANG SANDSTONE MACHINE.

The machines are constructed under the immediate supervision of George J. Wardwell, the inventor, who has given his exclusive attention for over twenty years to this one object of quarrying stone by machinery. He has made improvements from time to time and taken out twelve different patents for the same, and the engravings herewith illustrate his latest improvements which have been in practical use for ten years, and extensively introduced upon marb'e, lime, free and grit sandstone. These machines are the original and first practical inventions of the kind and for the purpose described. The company are prepared to supply machines promptly, and send a man when necessary to superintend the starting of every machine, or what is better, send skilled operators, at reasonable wages, to remain with and operate the machine for the purchaser. Duplicates for repairs of the best material and workmanship kept constantly on hand and furnished promptly at ordinary machine shop prices. Parties quarrying stone are solicited to give the invention a careful examination, and for terms address the Steam Stone Cutter Co., Rutland, Vt.

THE VERMONT MARBLE COMPANY, PROCTOR, VT., quarry a white marble, that is better than the Italian, and is used in place of it. They also get out and finish, blue, green, clouded, and all shades of blue and green marble. They quarry and saw yearly about twelve thousand blocks; these blocks weigh from five to twenty tons each. To get out these blocks they use twenty-five Wardwell steam channeling machines, six Ingersoll drills, eight diamond gadders and eight diamond drill two-spindle channeling machines, made by the Sullivan Machine Company. They run one hundred and thirty-six gangs of saws, each gang will saw fifty feet per day, making over six thousand feet sawed each day; have one large factory devoted to finishing marble for building purposes and they do the largest business in finished marble in the world. They are now running eleven rubbing beds, and are putting in two more. They have the best water powers in Vermont and use them to run their factories, and to compress air for use in the quarries.

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EXHIBITION FOR THE PREVENTION OF ACCIDENTS.

COMMENCING in April, 1889, there is to be an exhibition of four months' duration, in the city of Berlin, Prussia, to show practically how accidents may be prevented. This is a wonderful step in advance of this country in matters of this kind. Little is thought of the prevention of accidents by special means, in the factories, mills or quarries of this country. In certain instances mild precautions are taken against dangers. Accidents are so frequent in some of our manufacturing establishments that a surgeon is regularly employed, not alone for the purpose of caring for those who are injured, but for collecting evidence to be used in court against the injured party in case of suit for damage.

Most accidents are preventable. Certainly a very large proportion are altogether unnecessary. Where is the manufacturing establishment where it is not possible for regular attendants or visitors to come in danger of contact with moving machinery? Means are ready at hand for him to lose a hand, or a finger, or an arm, or suffer other injury if his attention is diverted even for a short time. He may back up against a set of gears; he may be crushed by a piece of planing machinery; he may be caught in a belt; he may be burned, poisoned or he may fall down badly constructed stairs. These and many other accidents may happen to him as he passes about a manufacturing establishment. There are other accidents which may occur to the watchful in the course of the regular discharge of duty, which are possible because of the mproper arrangement and construction of the devices employed.

The articles to be exhibited will consist in machinery, apparatus, of all kinds now in use, to guard against accidents in tools, working pieces and working materials; in models, in plans, drawings, photographs and specifications; in copies of regulations, rules for factories, statutes and printed matter relating to accidents and to their prevention.

As a rule the exhibition of articles in natural size and of models will be prepared. Machines should, as much as possible, be exhibited in operation. Since not only protective contrivances but also complete machines and apparatus with protective devices are to be exhibited, the exhibition will have, to some extent, the character of an industrial exhibition, with the difference only that objects which serve solely for technical purposes and can not be classed as contrivances for the protection of working people against accidents, are excluded. It is not intended to show merely the efficiency of any machine, but rather the efficiency of the same in connection with devices for the prevention of accidents. The best protective device renders a bad machine not recommendable; but a machine, good in itself, furnished with model equipment for the purpose of preventing, as much as possible, accidents, must in future, considering the burden, under the accident laws, cast upon the trade associations, of necessity deserve preference over a like good machine, being, however, without satisfactory appliances for protection. The exhibition will, therefore, offer an opportunity particularly to all manufacturers of machines who hitherto have taken a special interest in the question of such perspective measures, or, in future, intend to do so, to introduce their productions to the members of trade associations.

In order that the scope of the exhibition may be fully understood, we give space to the general classification.

Groups 1 and 2. Prevention of accidents near movable machine parts, generally; productive devices in transmission shafts, toothed wheels, beltings; disengaging gears, lubricating appliances, etc.

3. Protective measures in the working of elevators, lifters, cranes, derricks and other raising apparatus and machines.
4. Protective measures on motors.
5. Protective measures in the operation of steam boilers and other apparatus under pressure.
6. Preventive devices against, and safety devices in case of fire in insured works and workshops.
7. Providing for good illumination and prevention of accidents by means of lighting arrangements.
8. Prevention of accidents caused by poisonous (caustic or corrosive substances) obnoxious gases, etc.
9. Personal equipment of laborers.
10. Providence for injured persons.
11. Steps for the protection and well-being of working people in the metal industry.
12. Steps for the protection and well-being of working people in the wood industry.
13. Steps for the protection and well-being of working people in the textile industry.
14. Steps for the protection in the paper, leather and polygraphic industries.
15. Protection in the industry of articles of food and consumption.
16. Protection in the chemical-glass industries.
17. Protection in the milling and quarry industries.
18. Protection in building trades.
19 and 20. Protection in the trades of intercommunication.
21. Protection in the farming and foresty industries.
22. Literature (Library of the Exhibition),

This shows an intelligent regard for human welfare unknown in this country, and is to be emulated.

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The large number of designs of the Indiana Soldiers' and Sailors' Monument which have come to our attention, leads us to the belief that the architects of this country are lamentably weak in the matter of monumental work of this character. There is a store-building-public-hall-commercial spirit running through most of this work. It is merely the result of training in a particular direction. A great many of the designs show merely a struggle for the unusual. There was a mild development of the crank crop in this competition, however, its weakness was more one of infirmity than crankiness. The Grant Monument will bring out all of the cranks. The thing to be feared is that a selection of an off design will be made. The Grant competition is not in as good shape as the Indiana competition. The latter brought out the best talent in the country. Many of the best American architects will not go into the Grant monument competition.

CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT.	STRUCTURE.	COST.
Chicago	C. R. Adams	S. B. Dixon	Residence	$ 20,000
Chicago	Trinity M. E. Church	S. B. Dixon	Parsonage	10,000
Chicago	David Blair	R. G. Pentecost	Residence	5,000
Bhicago	H. H. Brown	Holabird & Roche	Residence	12,000
Chicago	Wirt D. Walker	Holabird & Roche	Manf'g. B'ld'g.	30,000
Chicago	Mrs. Murphy	J. F. Warner	Hotel	18,000
Chicago	Dr. W. Clark	A. G. Barfield	Flats	10,000
Chicago	Dennis Norton	A. G. Barfield	Dwellings	12,000
Chicago	S. R. Snowden	F. B. Abbott.		6,000
Chicago	L. Wickman	W. L. Carroll	Dwellings	12,000
Chicago	W. J. Wayne	Geo. Beaumont	2 Residences	30,000
Chicago	Dr. I. Quiles	Thiel & Lang	Store and flats	15,000
Chicago	F. Meyer	Theil & Lang	Residence	5,000
Chicago	Johnson Chair Co.	H. T. Kley	Factory	20,000
Chicago	City of Chicago	Edbrooke & Burnham	Police station	45,000
Chicago	J. V. A. Weaver	L. G. Hallberg	Dwelling	6,000
Chicago	Ansell & Goodrich	Wm. Thomas	2 Dwellinge	15,000
Chicago	Jonathan Clark	Flanders & Zimmermann	Store and flats	25,000
Chicago	P. Schoenhofen	A. Cudell	Residence	25,000
Chicago	John York	Furst & Rudolph	Store and flats	50,000
Chicogo	Geo. S. Willetts	L. G. Quackenboss	Residence	20,000
Chicago	Lewis & Dumont	D. S. & A. Pentecost	Dwellings	12,000
Chicago	W. H. Phelps	C. M. Palmer	Dwellings	8,000
Chicago	J. F. & J. P. Doen	J. Freund	Store and Flats	8,000
Chicago	E. Geistenburg	Fromman & Jebson	Residence	15,000
Chicago	Mrs. P. Kehoe	C. E. Lohmann	Flats	6,000
Chicago	Chas. Fries	H. Sierks	Dwelling,	5,000
Chicago	Jas. Connelly	C. P. Thomas	Dwelling,	18,000
Chicago	Nathan Smith	O. J. Pierce	Dwelling	8,000
Chicago	Ed. Kendall	Wilson, Marble & Sampson	Flats	5,500
Chicago	Libby, McNeal & Libby	Edbrooke & Burnham	Stables, etc.	20,000
Chicago	Chas. F. Elmes	C. C. Miller	Residence	10,000
Chicago	H. F. Rees	Cobb & Frost	Residence	20,000
Chicago	Julius Frankel	Schaub & Berlin	Store and flats	75,000
Chicago	Wm. Walk	Schaub & Berlin	Store and flats	30,000
Chicago	A. Moses	R. G. Pentecost	2 Residences	12,000
Chicago	A. J. Cooper		Stores and flats	100,000
Chicago	F. B. Baker	M.F. McCarthy	Hotel and theater	250,000
Chicago	H. Flentze	H. Rehwoldt	Flats	10,000
Kansas City, Mo.	W. M. Masters	A. Van Brunt	Block	9,000
Kansas City, Mo.	H. E. Henshaw	A. Van Brunt	Office building	30,000
Detroit, Mich.	J. Stroh	Spier & Rohns	Residence	15,000
Detroit, Mich.	T. U. King	Calfield & Hodge	Residence	4,000
Cincinnati, O.	D. H. Weisloder	Co-Operative Bldg. As.	Residence	4,000
Cincinnati, O.	A. Ball		Residence	12,000
Cincinnati, O.	J. R. Cravans	H. Wolf	Residence	4,000
Cincinnati, O.	Rufus King	S. Hannaford & Sons	Two story addition	3,500
Cincinnati, O.	H. Schaff	G. & A Brink	Flats	6,000
Cincinnati, O.	The John Shillito Company.	Adam J. Rost	Flats	20,000
Cincinnati, O.	P. Dooley	E. F. Bande	Tenement	6,000
Cincinnati, O.	Luke Stanley	Gus. W. Frach	Flats	10,000
Findlay, O.	J. S. Flint		Business block	30,000
Findlay, O.		Geo. Horn	Business block	
New York City.	Emma J. Mason.	E. B. Lowe	Flats and stores	22,000
Winchester, Ky.		Aldenburg & Scott	Bank	18,000
Chicago, Ill.		J. Farmer	Hotel	18,000
New York City.	22nd Regiment		Armory	300,000
Memphis, Tenn.	Amatuer Athletic Association		Club House	40,000
Findlay, O.	Charles Biglow	Kramer & Zoll		10,000
Albany, N. Y.	M. L. Ryder		Residence	
Albany, N. Y.	Carr & Burdick		Three flats	
Albany, N. Y.		Ogden & Wright	Flats	
Brooklyn, N. Y.		C. Monds	Three residences	15,000
Brooklyn, N. Y.		John Clark	Two flats	16,000
Brooklyn, N. Y.	F. B. Byrant	J. E. Reynolds	Residence	5,000
Brooklyn, N. Y.	J. and J. C Burling	J. L. Reynolds	Flats and store	12,000
New York City.	Fred Loebb	William Grant	Tenement	12,000
New York City.	E. A. Blaklie	John C. Burne	Flats	18,000
New York City.	Theo. A. Cordler	Ed. Wenz	Flats and store	30,000
New York City.	Jeremiah C. Lyon	Julius Munckwitz	Flats	70,000
New York City.	Fred R. Meres	A. Spruce	Flats	16,000
New York City.	Printers Association.		Monument	
Sutton, Neb.	City Council.	A. A. Richards	Water works	20,000
Logansport, Ind.	D. C. Elliott	Crain & Krutsch	Store & flat Bldg.	15,000
New York City.		C. Baxter & Co.	Factory	140,000
Pittsburg, Pa.	Bellefield Presby. Church Society		Church	40,000
Toronto, Can.	St. Alban's Society		Cathedral	250,000
Toronto, Can.	Baptists		Church	40,000
New York City.	The Tompkins Cong. Church	G. P. Chappell	Church	65,000
Paris, Ill.	Board of Supervisors		Jail	30,000
Providence, R. I.		Secy. H. A. Conant	Y. M. C. A.	100,000
Roann, Ind.	Cornelius Holderman's heirs		Church	100,000

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT.	STRUCTURE.	COST.
Kansas City, Mo.	D. H. Cox	A. B, Cross	Stores and flats	$ 18,000
Minneapolis,	Fred C. Hoyt	J. C. Roberts	Six residences	11,000
Minneapolis,	A. A. Pond	Long & Kees	Business block	15,000
Peoria, Ill.	Jacob Woolner	W. H. Milner	Residence	40,000
Peoria, Ill.	W. H. Ballance	W. H. Milner	Residence.	12,000
Peoria, Ill.	W. E. Francis	W. H. Milner	Residence	12,000
Peoria, Ill.	Wm. McLean	W. H. Milner	Residence	20,000
New York,	D. A. Loring	Lamb & Rich	Office building	65,000
Brooklyn, N. Y.	Hill & Sharp	C. P. Gilbert, N. Y.	Six flats	13,500
New York,	Patrick McManus	J. E. Terhune	Eight flats	18,000
Macon, Ga.	Horne & Sparks		Hotel	100,000
Waukesha, Wis.	David Whittingham	J. M. Porters	Hotel	7,000
Winona, Minn.	Mayor Ludwig		Hotel	80,000
Brighton, O.	C., H. & D. R. R.		Freight depot	12,000
Cincinnati, O.	C., H. & D. R. R.		Freight depot	15,000
Attalla, Ala.	Queen & Crescent R. R.	Adams & Schneider, Chattanoogo.	Depot	
Falmouth, Mass.	Old Colony R. R.	H, H. Winslow	Depot	
Cincinnati, O.	C., I., St. L. & C. R. R.	S. Hannaford & Sons	Freight depots	10,000
Lockport, N. Y.	N. C. R. R. Co.		Depot	30,000
Mobile, Ala.	J. C. Clarke	J. C. Clarke	Dry dock	
Des Moines, Iowa.		Mayor Carpenter	Viaduct	60,000
Omaha, Neb.	Board of Trade		Viaducts	
Troy. N. Y.	Delaware & Hudson R. R.		Twenty bridges	
Topeka, Kan.		Quincy Street Bridge Co.	Bridge	100,000
Hyde Park, Ill.		Village Trustees	Bridge	25,000
Clifton, O.		City Engineer	Macadamizing.	
Toronto, Ont.		City Engineer	Street Paving	
St. Paul, Minn.		W. T. Erwin	Street Paving	
Decatur, Mich.			Soldiers' monument	1,000
Minneapolis,	Stevens-ave. Baptist Church		Church	25,000
Detroit,	Johnson Bros.	A. C. Varney & Co.	manufactory	12,000
Detroit,	St. John's Parish	A. B. Crane	School building	25,000
Joliet, Ill.	Joliet Steel Co.	T. S. Allen	Athenaeum	20,000
Chicago,	Geo. Rapps	Wilson, Marble & Lamson	Residence	9,000
Chicrgo,	W. H. Henry	J. A. Wierzbienic	Stores and flats	8,000
Chicago,	W. L. DeWoolf	Y. V. Wadskier	Office and flats	40,000
Chicago,	H. C. Walker	J. A. Thain	Residence	30,000
Chicago,	E. H. Goodrich	F. R. Schock	Residence	10'000
Rockford, Ill.		J. S. Silsbee, Chicago	Church	12,000
Chicago,	Nathan Smith	O. J. Pierce	Residence	8,000
Chicago,	Rev. Thos. Burke	Bauer & Hill	Residence	12.000
Chicago,	B. Lowenthall	Bauer & Hill	Business block	35,000
Bloomington, Ill.	First Nat. Bank	M. E. Bell, Chicago	Bank building	50,000
Chicago,	Robt. Excell	G. H. Borst	Residence.	7,000
Chicago,	J. G. Deitz	F. B. Abbott	Store and flats	8,000
Chicago,	S. R. Snowden	F. B. Abbott	Flats	5,500
Chicago,	W. J. Mayor	Geo. Beaumont	Residences	30,000
Chicago,	C. W. Nichols	Geo. Beaumont	Residence	12,000
Chicago,	A. H. Lowden	Geo. Beaumont	Residences	21,000
Staunton, Va.	Lutherans	M. P. Funkhouser	Church	
Danville, Va.	Main-st. M. E. Church		Church	10,000
Galveston, Tex.	The city	Thompson, Nonoord & Shepherd, com	College	50,000
Dallas, Tex.	North Texas Nat. Bank		Bank building	
Ballinger, Tex.	The county	W. L. Tournee	Court House	30,000
Austin, Tex.	The state	State University Trustee	College	
Winston, N. C.	T. L. Vaughn		Residence	15,000
Oxford, N. C.	The city	J. A. Williams	Water works	25,000
Washington, D. C.	Geo. Prince		Residence	12,000
Washington, D. C.	F. F. Schneider		Buriness block	75,000
Baltimore, Md.	Flynn & Emerich		Manufactory	
Baltimore, Md.	The city	Robt. B. Martin, Eng.	Reservoir	
Baltimore, Md.	Fred Hertel		Seven brick bldg.	
Baltimore, Md.	David H. Turner		Nine brick bldg.	
New Orleans, La.	Tulane Bldg. Co.	Mr. Waters	Business building	
Pleasant Valley, Ky.	Kentuck Central R. R., Covington		Bridge	
Mt. Sterling, Ky.	The city	The Mayor	School house	10,000
Savannah, Ga.	Savannah Hotel Co.	W. G. Preston, Boston	Hotel	
Rome, Ga.	Rome Land Co.		Dummy railroad	
Macon, Ga.	Macon Aut. Refrigerator Co.		Manufactory	50,000
Fort Valley, Ga.	The city	J.F. Jenkins, Columbus	Water works	
Augusta, Ga.	E. W. Herman and others, Louisville		Brewery	50,000
Mobile, Ala.	The county	Rudolph Benz	Court House	50,000
Jacksonville, Ala.	J. A. Gaboury		Residence	8,000
Gadsen, Ala.	W. S. Standifer		Residence	8,000
Florence, Ala.	N. F. & S. R. R. Co.		Depot	
Decatur, Ala.	Casa Grand Theater Co.	Want an architect	Theater	100,000
Birmingham, Ala.	Eddy & Brown		Business block	6,000
St. Paul, Minn.	Ledom Scharp		Block of Residences	25,000
Milwaukee, Wis.	Chas. Lemge	H. P. Schnetzky.	Residence	10,000
Milwaukee, Wis.	C. Walch	Douglafs	Residence	4,000
Kansas City, Mo.	Mr. King		Block	6,000
Kansas City, Mo.	Matt Stradler	Louis M. Simms	Business block	3,000
Kansas City, Mo.	C. H. Penneck	Gibbs & Parker	Business Block	7,500
Kansas City, Mo.	L. C. Kranthoff	E. P. Brink	Residence	15,090
Kansas City, Mo.	Thomas Reilly	A. B. Cross	Business Block	14,000
Kansas City, Mo.	T. G. Bracking	E. S. Fassett	Flats	10,000
Kansas City, Mo.	Geo. Harton	E. S. Fassett	Block	4,500
Kansas City, Mo.	W. W. Osbourne	E. P. Brink	Eight Residences	22,000

PRICE CURRENT.

ARTIFICIAL STONE.

(C A. Stevens, Lansing, Mich.)

	Sq ft
Sidewalks	12½c
Building stone, plain	20 c

BLUESTONE.

New York	45c
Wyoming Valley	

[Forest City Stone Co., Cleveland, O.,]
(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches	20
	Sup. ft.
Flagging, 4 to 6 inches thick, any size up to 12 ft. long	12c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	40
No. 2. " "	30c
No. 1. Monument Bases, broken to size	45c
No. 2. " " " "	35
Engine beds, broken to size,	40
Perch or Wall Stone, per ton railroad weight	50c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	60

Union Bluestone Co, New York.

Flagging.

Rough Flag, promiscuous sizes	$ 3
Smooth " " "	10
2 and 2.6 Smooth Flag, 1½ in. and over	12
3 " 3.6 " under 1½ in. thick	11
3 " 3.6 " 1½ in. and over	13
Cess-Pool Flag, 2 to 2.8 in. square, 3 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1½ and under 1¾ in. 2 ft. and over wide, wide	13
4 and 4.6 in. smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in	23
6 ft. " " " 3 in	25
6 and 6.6 Smooth Flag, 2 in. and over	17
5 and 5.6 " " under 2 in	15
6 and 6.6 " " 2 in. and over 18	18
6 and 6.6 " " under 2 in	16
Well Stone, 3 to 3½ in. thick, 4 to 4.6 in. square	24
Well Stone 3 to 3½ " 5 to 5.6 "	28

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag.

6 ft. to 6.6, x 5 to 6 ft. wide	$ 22
7 ft. to 7.6, x 4 to 5 ft "	24
8 ft. to 8.6, x 4 to 6 ft. "	28

The above to be 2½ inches thick.

Promiscuous Large Flag.

30 to 50 ft. 3 in. thick	28
50 to 70 "	38
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thickness at special prices.

For planing add 22 cents.

For rubbing add 35 cents.

Window Sills and Lintels.

3 x 8 in. Quarry cut	22
4 x 8 in. " "	24
5 x 8 in. " "	29

¼ in. allowance in thickness.

Door Sills.

5 x 12 in. Quarry cut	3½ cts. per in. in width
5 x 14 in. " "	
6 x 16 in. " "	

8 to 10 ft. long, add 10 cts. per foot

Curb, Quarry Cut.

Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in. thick	27
14 " under 4 in. "	28
14 " 4 in.	32
16 " bev'd, under 3½, 3 ft. and over, long	31
16 in. Curb, 3½ to 4, 4 ft. and over, long	33
18 " 3½ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	55
16 in. Corners, per foot	5 50
20 " "	6 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.

12 in. gutter, 3 to 3½ in	17
12 in. " thin	14
14 in. " 3 to 3½, in. 3 ft. and over, long	20
14 in. " thin, 2.6 and over, long	18
16 in Belgian Bridge, 4 in. thick	44
20 in. " " 4 in. thick	55
24 in. " " 4 to 4½ in	65
24 in. " " 5 to 6 in	77
24 in. " " 7 to 8 in	90
19 in. Bridge Flag Joints, 3½ in	28
20 in. " " " 3½ in	40
24 in. " " " 4 in	50

Coping.

11 in. Coping, 2 to 3 in	23
14 " 2½ to 3 in	29
16 " 2½ and under 3½ in	40
16 " 3½ to 4 in	45
18 " 3½ to 4 in	50

20 in. to 36 in. Coping, 4 in. thick, 3¼ cents per in. in width. When ordered over 4 in. thick, special price will be given. When ordered under 4 in. thick, 3 cents per in. in width.

Steps.

6 x 12 in. promiscuous lengths, under 8 ft	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft. and up to 10 ft. long, add 10 cents per foot.

Rock.

Promiscuous Rock, per in. in thickness	9
Dimension Rock, per in. in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 inches Thick

Under 20 feet	30
20 feet and under 35 feet	38
35 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price

Above, if dimension both ways, add 10 per cent,

For 5 in. add 10 cts.
" 6 " 20
" 7 " 30
" 8 " 40
" 9 " 55
" 10 " 65
" 12 " 100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.

4x8 in	43
5x8 in	50
5x9 in	60
5x12 in	77

¼ in allowance in thickness.

Rubbed Lintels.

3½ to 4 x 10½ in. under 8 ft	48
8 ft. and under 10 ft	60
4 in. x 13 in. under 8 ft. in length	67

Rubbed Curb.

2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in	48
12 " " " 4 in	55

Rubbed Mantels.

4 x 10 in	55
4 x 12 in	65
4 x 14 in	75

Dimension lengths with heads, measure heads.

Rubbed Hearths.

3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4.6 in. long, 1.4 to 2 ft. wide	33
" 4.6 to 5.6 " 1.4 to 2.6 in wide	40
" 5.6 to 6.6 " 1.4 to 3 ft. wide	45
" 6.6 and under 8 ft long, 3 to 4 ft. wide	65

Rubbed and Jointed Tile.—Boxed.

Under 2½ in. thick, 12 to 30 in. square, per superficial ft	55

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.

3 ft. and 3 ft. 6 in., 1 ft. 6 in. and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 5 " 6 " 2 " "	39
6 " 6 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cement and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

BROWNSTONE.

[All quotations f. o. b. quarry, unless otherwise mentioned.]

	Cu. ft.	
Carbondale, light	70c.	f. o. b. quarry
" dark	95	" "
Hummelstown	45	" "
Lake Superior	100	" Chicago
Trenton	50	
Ohio	35	
Linden	80	

OHIO BROWNSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	60c
No. 2. " "	50

Stone ordered to dimension sizes 10 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT—

(Middlesex Quarry Co., Portland.)

	Cu. ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. in dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft. and over, price to be agreed upon.	

	Superficial
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft. long, promiscuous sizes	63
Platforms, Cornice, etc., 7 to 8 in. thick, under 18 superficial feet	85
Platform, Cornice, etc., 18 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	1 12
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashlar, under 4 in. thick	20
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 8 in. promiscuous lengths	63
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft	1 30
" " 10 and under 20 cu. ft	1 60
" " 20 cu. ft. and over, price to be agreed upon.	

Monumental Stone, 8 to 12 in. thick, charged 12 in.

Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in. thick	58

Discount 5 per cent.; cash or approved Notes, at two months.

(Chas. W. Stearns, Cleveland, O.)

Brown stone	75c f. o. b. quarry.

FREESTONE.

New Brunswick brown	45c
Buena Vista	40
Ohio	30
Long meadow	60

GRANITE.

Westerly	
Monson	
Woodstock	50c
Mica Stone	50
Port Deposit	40

GREEN STONE.

Pennsylvania	50c

LIME, CEMENT, ETC.

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f.o.b. Erie.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	50
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " 1 " " " "	35
Fire brick Savage per 100	5 00
" " Acton " "	4 00
" " Montezuma " "	3 50
" " West Virginia " "	3 00
Ground fire clay, best, per bushel	1 00
" " " common " "	75

Discounts

Vitrified sewer pipe,	50 per cent.
Flue Pipe, for Chimneys	25 " "
Terra Cotta Chimney Tops	25

LIMESTONE.

	Cu. ft.	
Salem, Bedford	25c	f. o. b. quarry.
Oolitic, " buff	25	" "
" " blue	35	" "
Oolitic Bowling Green	25	" "
Artesian	35	" "
Grafton	35	" "

MAGNESIAN—

(J. A. Green, Stone City Iowa)

Dimension Stone—(First Quality of all ordinary sizes.)

12 inches and over, per cubic foot	$ 35
11 to 12 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17

Vault covers—(Large size.)

7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25

Flagging Stone—(Ordinary size)

5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10

Bridge Stone.

Common, per cubic yard	$ 2 50
Coppings, " " "	6 75
Pedestal Bases, per cubic yard	6 75

Footing Stone.

Dimensions, per cubic yard	$ 3 25
Common, " " "	2 50

Rubble or Building Stone.

Common Rubble, Per 100 lbs	2½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	6

Street Crossings.

5 to 6 inches, per superficial foot	$ 15
Curbing, 5 to 6 inches thick, per superficial ft.	15

Cut and Rubbed Stone—(Finished Ready to lay in their place.)

Ashlars per sq. ft. measuring all that shows	$ 60
Base	70

Corner Blocks

atforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

JOLIET ....Rubble, $6 cord; dimension 30c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	66
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts. per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts. extra per superficial foot.

Rough Stone.

Mill Blocks as quarried, per cu. ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc.	60
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft.	15c
Promiscuous good select Bridge Stone, cu. ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 3 per ct., on rough and dimension, and 5 per ct. on sawed.

(H. Dearborn & Son, Stone City, Iowa.)

Dimension Stone Drilled to Given Size.

	Per Lineal Foot, f. o. b.
Water Table, 11 and 12 inches thick	35c
" 9 " 10 " "	30
" 7 " 8 " "	28
" 6 " " "	25
Belt Course, 5 to 7 inches thick	25
Window Caps and Sills	25

Dimension Stone in Large Pieces.

12 inches thick and over, per cubic foot f. o. b.	35c
11 and 12 inches, per superficial foot f. o. b.	30
9 " 10 " " " "	27
7 " 7 " " " "	25
6 " " " "	20
5 " " " "	17
4 " " " "	12
3 " " " "	10
Rough Flags, promiscuous sizes, all shapes, per carload	25 00

Ashlar all Lengths.

11 and 12 inches thick, lineal	$ 25
9 " 10 " " "	20
7 " 8 " " "	17
Bridge Stone, per cubic yard	2 50
Footing " " " "	2 25
Dimension Footings per foot	15
Bridge Coping and Pedestal, per cubic foot,	25
Street Crossings and Curbs, per superficial foot	20
Block Rubble drilled, per 100 lbs	5 Cents
Heavy Block Rubble, per 100 lbs	4 Cents
Select Rubble, per 100 lbs	3½ Cents
Common Rubble, per 100 lbs	2½ Cents
Riprap, per carload	1 50

Flagging Cut Ready to Lay Down.

7 and 8 inches thick, per superficial foot	35c
6 " " " " "	30
5 " " " " "	22
4 " " " " "	17
3 " " " " "	14

Cut Stone.

Window Caps and Sills, per lineal foot	$ 50
Window Caps and Sills, over one foot wide, per superficial foot	50
Water Table, 11 and 12 inches, per lineal foot	1 00
" " 9 " 10 " " " "	75
" " 7 " 8 " " " "	60
Door sills, platforms and steps, per superficial foot	60
Frieze Course, per superficial foot	60
Ashlar, per superficial foot	50
Corner Blocks, plain, per superficial foot	75
" " rustic " " "	85
Bases, per superficial foot	70
Circular and Segment Caps, outside measure, per lineal foot	75
Circular and Segment Caps, beveled and scotia, per lineal foot	1 00

[Big 4 Limestone Co., New Point, Ind.]

Prices on cars at quarry, the buyer paying freights.

Flagging for Sidewalks.

	In Rough.	Jointed.	Jointed and 4-cut Hammered.
3-inch	10c	13c	20c
4 "	16c	21c	26c
5 "	17c	22c	27c
6 "	18c	24c	30c
7 "	22c	28c	34c
8 "	24c	30c	36c
9 "	26c	33c	39c
10 "	28c	36c	43c
11 "	30c	38c	44c
12 "	32c	40c	45c

2c extra when over 14 feet long or in strips less than 2 feet broad.

Platforms	In Rough	6-cut Face, 6-cut Edges.	8-cut Face, 10-cut Edges.
6-inch	22c	58c	65c
7 "	24c	58c	65c
8 "	28c	58c	65c
9 "	30c	58c	65c

Block Stone.	Cu. ft.
12 inches thick or over	—
Irregular sizes, 20x70 ft.	30c
Special sizes	33c
Bases	33c

Block stone less the 12 in. thick at Flagging Prices.

Bridge Stone.	Ton of 2,000 lbs.
First-class, dressed	$2 25
" undressed	1 30
Second-class	1 00
Coping, 12 in. thick and over	2 15

" less than 12 in. thick at flagging prices.

Building stone.	Ton of 2,000 lbs.
Riprap	$0 25
Ordinary Rubble.	60
Range Rubble (select)	1 00
Scrap Flagging	1 50

Range stone 6 to 10 in. thick, 6 to 10 in. wide, 18c lin. ft.

Jail Stone.	6-cut Hammered.
6-inch, one side dressed	34c
both sides dressed	46c
7-inch, one side dressed	38c
both sides dressed	50
8-inch, one side dressed	42c
both sides dressed	54c
9-inch, one side dressed	46c
both sides dressed	58c

Door Sills and Steps

6-inch, per sup. foot in rough	Sq. ft.	20c
7 " " " "	"	25c
8 " " " "	"	30c
Ordinary dress, 6-cut edge, 4 cut face	Sup. ft.	50c
Extra dress, 6 cut edge, 6 cut face	"	58c
" 10 " 8 "	"	65c
Sawed sills of all kinds per sup. foot		—

Strips less than 12 inches wide same price per lineal foot as Sills and Steps are per superficial foot.

Culvert Covering and Footings.

Same price as Footings.

Irregular sizes, ...6 to 9 in. thick, 11c 10 to 12 in. 12c
Dimension " ....8 to 9 in. thick, 13c 10 to 12 in. 14c

Crushed Stone.

In orders for 25 cars and over........35c per ton.
" of less than 25 cars........40c "

Invert Stone for Sewers.

9x20 in. x 2 ft. radius........95c lineal foot.
9x20 in. x 3 ft. "........90c "

Pier Stone.

Stone in rough, 25c per cubic foot.

The thickness optional with consignor.

If dressed, add to price of stone in rough for bedding and pitching face, 18c per cubic foot. For bedding and tooth axing face, 25c per foot face measure.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	16
3 " " " "	12

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	22
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing.

10 to 12 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone.

$3 to $4.50........per cubic yard.

Rip-Rap.

$1 to $2.50........per car load.

MARBLE.

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial in. ⅞	1	1¼	1½	2	3	4	Monumental.
Dark Veined Blue	25	30	35	50	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	55	55	85	1 10	4 00
Ex. Dk. Veined Blue	35	40	50	60	60	90	1 20	4 50
Ex. Dk. Mottled Blue	40	45	55	70	70	1 05	1 40	5 00

Dark blue base strips and posts, per cubic foot	$1 75
Dark blue bottom bases........per cubic foot	1 75
Dark blue bottom bases defective, per cubic foot	1 25
Dark blue markers, 0.10 to 1.2 long, 4 in. thick each	50
Dark blue markers, 0.10 to 1.2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 8 in wide, assorted sizes each	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra........cubic foot	50
Strips ordered 7 0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing........per cubic foot.	35
Boxing........" "	25

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental
Statuary	90	1 15	Same as 2 inch.	1 35	2 00	2 70	8 50
No. 1	75	90		1 10	1 65	2 90	6 50
Average	60	70		78	1 12	1 50	5 25
No. 2	40	45		56	72	1 10	4 25
Rutland Italian	30	35		56	82	1 10	4 25
Mottled Smith	......	......		40	60	90	3 50
Best No. 3	27	32		35	50	70	3 00
No. 3	18	22		25	37	60	2 00
Extra dark and mottled blue	40	50		60	90	1 20	4 50
Dark blue	30	35		50	75	1 00	3 50
Light blue	20	25		30	45	60	2 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in inches.	Diam. Bowl in inches.	Rutland Average, S. F. D. M. V. Mount Dk. No. 1	R'l'd No. 2 ex. dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No. 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue. Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	2 40
8	5	2 95	2 85	2 75	2 65	2 55	2 65
9	5	3 15	3 05	2 95	2 85	2 75	2 78
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 80	3 60	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 30
13	6	4 50	4 30	4 10	2 93	3 70	5 50
14	6	4 80	4 50	4 30	4 00	2 90	5 70
12	7	5 15	4 85	4 55	4 35	4 15	5 78
13	7	5 35	5 05	4 75	4 55	4 35	6 25
14	7	5 65	5 25	4 95	4 65	4 45	6 50
15	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 40	6 30	5 80	5 60	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 00	7 40	6 90	6 40	6 00	8 90
16	9	8 80	8 10	7 50	7 00	6 60	9 50
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 50	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 50
18	10	11 35	10 85	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 25	14 25
24	10	13 75	12 45	11 35	10 35	9 55	15 75
18	11	13 75	12 55	11 55	10 65	9 95	15 85
20	11	14 55	13 25	12 15	11 15	10 85	15 85
22	11	15 35	13 95	12 75	11 65	10 85	16 85
24	11	16 25	14 65	13 35	12 15	11 25	17 85
18	12	15 85	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 85	17 95
22	12	17 75	16 05	14 55	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 90	14 35	13 15	......
28	12	20 65	18 45	16 55	14 95	13 65	......
24	13	21 20	19 00	17 10	15 50	14 20	......
26	13	22 60	20 10	18 00	16 30	14 80	......
28	13	23 80	21 20	19 00	17 10	15 60	......
30	13	25 00	22 30	19 90	17 90	16 30	......
24	14	25 80	23 20	21 00	19 10	17 00	......
26	14	27 40	24 70	22 30	20 30	18 70	......
28	14	29 90	26 20	23 60	21 40	19 70	......
30	14	30 90	27 70	24 90	22 50	20 70	......
32	14	32 70	29 20	26 20	23 70	21 80	......

Hearths, 1 in., sawed edges, per sup. foot	$ 24
No. 3 Base strips and posts, cubic foot	1 90
Inferior No. 3 posts and strips "	1 65
" No. 3 bottom bases "	1 65
" No. blue posts, strips and bottom bases	2 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4"	1 00
Footstones, 5 to 8 in., each	30
" sawed heads, each	32
" " sand rub and box	38

SUTHERLAND FALLS MARBLE—

1885	Superficial. 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental.
Mourning veins	53	66	87	98	1 38	1 84	5 40
No. 1	48	56	82	87	1 30	1 74	4 90
Average	38	49	62	67	1 00	1 34	3 50
No 2	29	34	42	47	70	94	3 15
Best No 3	23	29	35	37	58	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Strips and Posts, per cubic ft.	$1 90
Inferior No. 3, Posts and Strips, per cubic foot	1 65
Inferior No 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 12 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 2 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup. ft.	24

MOUNTAIN DARK MARBLE—

1885	Superficial. ¾ in	1¼ in.	2 in	3 in.	4 in.	Cu. Monumental.
No 1	[illegible]	74	1 07	1 60	2 14	5 90
Average	44	64	87	1 30	1 74	4 90
No 2	37	49	67	1 00	1 34	3 90
No 3	25	34	52	78	1 04	3 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No 3, Strips and Posts, per cu. ft.	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " " small lots,		12
Sponges	per lb.	75
Red Grit	"	05
Nova Scotia Blue Grit	"	05
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

ITALIAN MARBLE—

	Cu. ft.
Monumental stock	$4 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size.
⅜ in slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubic foot.

Branches of Vermont Marble Co. see price list.

Toledo	40c.
Cleveland	35
Boston	50
Philadelphia	45
Detroit	40
Chicago	50
St. Louis	60

	Cu. ft		
Tennessee Red	$2 50@$3 00	f. o. b.	Chicago
" Knoxville,	3 00	"	"
Vermont White	3 50@ 8 00	"	"
Ophite	4 50@ 5 00	"	"
Armolite	1 50	"	"

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 3 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 24,000 pounds or more in one order.

GEORGIA MARBLE—

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$6 50	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 60
Cherokee, average	2 75	3 10
No. 3 base Strips and Posts	1 60	1 95
Inferior No 3 Posts and stripe	1 25	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	85
Markers, 16 to 18 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	25	35
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	50
Stripsordered, 9 feet long or over, extra	50	50

Urn list, sent on application.

(Columbian Marble Company.)

SAWED MARBLE—

Columbian Dark.

	per cu. ft.
Extra dark variegated	$5 00
No. 1, dark variegated	4 50
No. 1 dark mottled	4 50
No. 2 dark	3 50
Pearl blue	3 50
Inferior dark bases and stripe	1 75

Columbian light.

Light medium Cloud	$1 50
Best light cloud	3 50
No. 2 light cloud	2 50
No. 3 light cloud	2 00
Inferior light	1 25

	Per superficial foot. 1 in	1¼ in	1½ in.
Extra dark variegated	50	62	80
No. 1 dark variegated	40	55	75
No 1 dark mottled	40	55	75
Pearl blue	35	45	55
Light medium cloud.	40	55	75
Best light cloud	38	45	55
No. 2 light	25	30	35
No. 3 light	18	22	25
Hearth, sawed edges	20	—	—

Sawed marble.

	each.
Footstones, 5 to 8 inches	$ .20
Footstones, 5 to 8 inches, sawed heads	.32
Footstones, 5 to 8 inches, sawed heads, sanded and boxed	.28
Footstones, 5 to 8 inches, oval heads.	.28

Extra charges.

	per cu ft.
Diminished dies	$ .60
Strips and posts, 7 feet and over	.50
Sand rubbing	.35
Boxing	.25

All monumental stock will be boxed, with the exception of base strips and posts, unless otherwise ordered.

Building marble, tile and carbing. Prices given on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

	cu. ft.
Extra dark veined	$1 50
Dark blue	3 50

TOOLS—

⅜ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	33
Frosting Tools	per doz.	3 00
⅜ in. Granite Lettering Tools	"	2 50
½ " " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mash "	" 2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	2 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb.	each,	$ 50
3 to 5 lb.	"	75
5 to 7 lb.	"	1 25
8 lb. and up	"	1 50

[J. H. Knippenberg, Cleveland, O.]

Stone Cutters Mallets $12 00 Doz.

Wooden Rolls for stones 3 feet long 4 5 6 7 8 in.
20c 35c 50c 65c 75c each

SPECIALS—

Diminished Dies, extra per cubic foot	50c
Strips ordered 7 ft. long and over, extra per cubic foot.	50
Sawing edges slabs, 1 inch thick per superficial ft.	03
" " " 2 " " "	05
" " " 3 " " "	08
" " " 4 " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths per surface foot rubbed	05

MACHINERY.

STEAM PUMPS—

	Discount
Smedley's	25 per ct

PULVERIZERS—

	Discount
Cyclone	20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete $400

EXCAVATORS—

Little Giant	$4,500
Railroad Giant	6,500

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting, Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20	25.00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$50 00
" 0	" " " " with "	54.00
" 1	" 21x27, " 10 with hood	40.00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 5,	Hearth 21-inch, fan 8 inches, with dash	$21 00
" 7	" 21x30 " 10 " with half open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Iron	33⅓
Steel	37½
Gal. Iron	33⅓

(Washburn & Moen M'f'g. Co.)

Iron	33⅓
Steel	37½
Gal. Iron	33⅓

BLOCKS AND TACKLE—

(Toledo Block Works.)

Thick Mortise Blocks	Single	Double	Triple
8 inch iron bushed	2 40	4 50	6 30
10 " "	3 30	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	5 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	29 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	13 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00

Wrought-iron Tackle Blocks	Single	Double	Triple
6 inch	1 40	2 25	2 75
8 "	2 40	3 50	4 50
12 "	4 55	8 10	10 40
16 "	9 55	15 70	22 00
20 "	22 00	33 40	50 00

Iron-bushed, discount 20 per cent.; roller bushed discount 10 per cent

(Detroit Block Works.)

Discount from list 40 per ct.

WROUGHT-IRON PIPE—

(American Tube & Iron Co.)

		Discount
Butt weld, black	.55	per ct.
" " galv	.45	"
Lap " black	.65	"
" " galv	.65	"

BELTING-RUBBER—

Standard	60 per ct. and 10 per ct.
X quality	50 " " 10 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	33 00

RED SANDSTONE.

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	60c
Danreith	50c
Darlington	40
McArthur	45
Carlisle	65
Potomac	50

SLATE.

ROOFING SLATE—

[Henry Fulmer, Easton, Pa.]

F. O. B. Slatington, Pa.

Size.	No. in sq.		Size.	No. in sq.	
14x24	98	$3 50	10x18	192	$3 75
13x24	106		9x18	214	
12x24	115		10x16	222	
12x22	127		9x16	247	
11x22	138		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS

	sq. ft.
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 18 cents square foot in car lots.

[Coalman & Westcott Fairhaven Vt.]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17

For rubbing both faces of above, excepting caps and trusses extra	.02
Any of the above unrubbed less	.01
Steps, to 5 ft. in length	.20
Steps, 5 ft. to 8 ft, "	.25
Steps larger	special
Platforms to 16 sup. ft.	.20
" 16 to 22 " "	.25
" 22 to 28 " "	.30
" Larger	special

Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	.22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	.22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscoting, sup. ft.	.20
Black Boards, ½ to ¾ up to 3 ft. wide, crated sup. ft.	.18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft	.20
Black Boards, 3½ ft. to 4 ft. wide crated, " "	.22
Thresholds to 5 ft. in length " "	.20
" 5 ft. to 8 ft. " " "	.26
Curriers' Slabs, faced one side crated, " "	.30
Curriers' Slabs, faced two sides, crated, " "	.34
Billiard Table Beds, crated, " "	.32
Imposing Stones, " "	.30
Grave Covers, sawn and planed only, and in two or more pieces, " "	.16
Grave Boxes, rabbeted ends, " "	.20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	.16
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	.20
16 to 22 " "	.25
22 to 28 " "	.30
Vermont Red	$13 50 f. o. b. Chicago.
" Purple	5 50 " "
" Green	5 50 " "

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40 f. o. b.
8x14, 9x14, 10x14, 12x15, 15x30	2 65 "
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 14x24	2 75 "
9x18, 10x18, 10x20, 11x22	2 85 "

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 75	" "
Maine	5 50@5 80	" "

BLACK—

(Michigan Slate Co., Lansing.)

Michigan	$5 50 f. o. b. quarry

PURPLE ROOFING SLATE—

(Hazard Slate Company Fair Haven, Vt.)

	First.	Second
24x12	$3 75	$2 25
22x14	3 75	2 25
22x12	3 50	2 25
22x14	3 85	2 25
20x12	3 85	2 25
20x10	3 65	2 25
18x12	3 50	2 25
18x10	3 50	2 25
18x 9	3 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	3 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	2 75	2 25
14x 9	2 75	2 25
14x 8	2 75	2 25
12x10	2 50	2 25
12x 9	2 50	2 25
12x 8	2 50	2 25

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—	Cu. ft.
No. 1 Promiscuous block	.50c
No. 2 " "	.40

BEREA AND BLUE AMHERST—	
No. 1 Promiscuous Blocks	.40c
No. 2 " "	.30
No. 1 Monument Bases, broken to size	.45
No. 2 " " " "	.25
Pier Blocks " "	.20

SPLIT FLAGGING—	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 6 " "	09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—	Sq. ft.
3 in. Buff Amherst	.25c
6 " " "	.46
9 " " "	.68
12 " " "	.88
3 in. Berea or Blue Amherst	.21
6 " " "	.41
12 " " "	.77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	.10
2½ " "	.12
3 " "	.14
4 " "	.18

SPLIT PLATFORMS— Superficial feet.

	5in.	12 in.
No. 1 Buff Amherst	.25c	60c
No. 2 " "	.20c	50
No. 1 Berea or Blue Amherst,	.20c	50
No. 2 " " "	.17c	40
No. 3 " " " (for sidewalks)	.12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—	Cu. ft.
Promiscuous Blocks	.15c

Discount 25 per cent.

Write for discounts, etc.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—	Cu. ft.
No. 1	.30c
No. 2	.25

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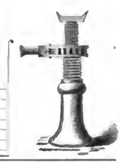

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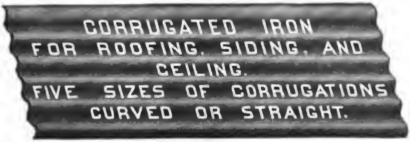
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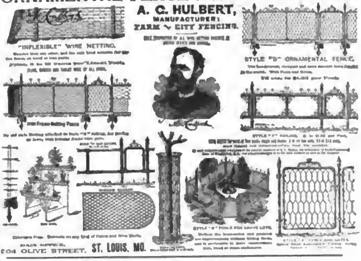
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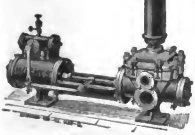

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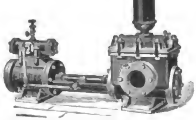

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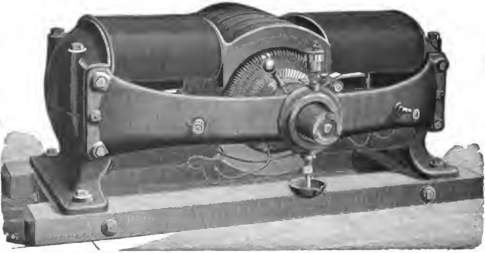

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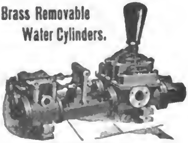

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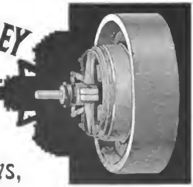

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VOL. I. INDIANAPOLIS IND., AUGUST 1888. NO. IV

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

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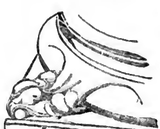
The convention of marble dealers, at Cleveland on the 11th and 12th of last month was an event of some interest, and of particular benefit to those immediately concerned. The idea of state and national organization is one well worthy of consideration by all who are engaged in doing business of any kind. If we look around us and note the most profitable enterprises we will see that they are the ones which are well represented in state and national organizations. Not that the state and national organizations do all this, but the fact that they are well organized in this particular way indicates that they are well organized otherwise. At the same time that they appreciate the benefits of organization in general, they appreciate detail. There are lines of business where the matter of organization is carried even farther than that of state organization, viz: into district organizations as they are called. It is a question as to whether this is necessary in the case of marble dealers, though in the case of stone quarrying it is in common practice. For instance, quarrymen in particular sections of a state organize to restrain competition. They form a community whose interests are regarded in common. In one of the recent conventions in another line one of the most successful business men in that interest said that there was no such thing as over-production among intelligent people, but among those who were less intelligent there was over-competition. While we are not inclined to agree with this fully there is in it a very valuable idea. In all business organizations, the meetings of which are represented by conventions, there comes up many matters of business interest for consideration by intelligent business men. Notably, evils which are the outgrowth of unrestrained and careless competition. No one objects to intelligent competition. There is the matter of time on sales, prices in general and details which are peculiar to each particular line of business. Intelligent people can organize for mutual business profit.

No one who is not possessed of a general interest in the stone resources of the country at large can form an adequate idea of that which belongs to this nation in the matter of building stone. Each year adds to its development, and each year widens the horizon of knowledge of the stone resources which is in advance of its development. Granites, marbles, limestones and sandstones are found all over this country in profusion and elegance not thought of a few years ago. The very number of quarries which are coming into market must have the effect of causing a larger amount of stone consumption in proportion to the building done, than has been common in the past. The development of quarries will cause the use of stone to be pushed and the impetus given by its successful use will multiply the present consumption. Hence the development of new stone resources will increase measureably the use of stone for building purposes. Increased production always means increased consumption. Such a thing as over-production for any great length of time is out of the question. Large productions increase the amount of consumption. An increase of production in excess of the ordinary requirements developes arguments and inducement for the larger use of material which is supposed to be subject to over-production. A tendency toward what is ordinarily regarded as over-production has the effect of reducing the cost of production and in that sense offers inducement to increased uses of the material in question. It is a part of the policy of that great trust, the Standard Oil Company, to constantly increase its productive facilities regardless of the demands of the country. Their argument in sustaining such a course is that they are in business to sell everything they have and that their existence is not justified when production is hampered. They say that the world consumes or should consume so much petroleum, and that it is the business of the selling agents to see that the world buys it from them. This policy has caused primarily a reduction in the cost of production, and in the end a business which has kept apace with the productive qualities of that corporation.

Statistics indicate that the production of building stone was greater in 1882 than in any year subsequent thereto up to and including the year of 1886. Since that time we are without statistics. Information of this kind is, of course, gathered largely from the larger cities. Great building activity in such localities would indicate, from a statistical standpoint, relatively larger increases in the use of stone than really existed. On the other hand a falling off in the amount of building in the large cities would represent a decrease in the amount of stone used which could not be justified if all of the facts were known. It so happens that the building activity in the smaller towns is not dependent upon the activity in the larger cities. Subsequent to the year 1882, a large use was made of terra cotta in the larger cities. Within the last year or two, there has been a decline in the amount of this material used in building. Altogether we judge that taking the country at large, the amount of stone used in building is constantly on the increase. One among other reasons for this is that the quality of building is improving. Again, new quarries are being opened up and the idea of building with stone is being pushed with greater vigor. One factor leading to the greater use of stone in building has been the influence of Romanesque architecture which received its great impetus from the successful work of the late H. H. Richardson. We are now experiencing a vigorous Romanesque revival, which architecture is securing a firm footing in America. Rough stone quarry face is largely used in this architecture. For the most part it invites that the walls be made solid rather than veneered. Which fact in itself contributes to an increased use, though the use of rough stone rather than brick in some of the best buildings, which latter was a more common material a few years ago, must have its influence in stone construction. We said that terra cotta was used less than it was a few years ago. We know this because we cannot but observe that the prominent architects who were using terra cotta almost to the exclusion of stone a few years ago have now largely abandoned its use and are using stone. We are not undertaking just at this time to state why this is true but feel justified in representing it as a fact. The reasons are not difficult to reach. Taking it altogether, more stone is being used in building throughout the country at large than ever before, and with the incentive in that direction, for the reason stated and because of a general desire for more permanent building as well as a regard for the artistic quality which in the past has been so largely neglected, we may expect to see a constantly increasing demand for stone.

PRESERVATION OF STONE IN BUILDING.



BASE—12TH CENTURY.

IN any of our larger cities where stone is used to any great extent for building purposes and where the buildings are of any age, may be seen evidences of decay which should be cause for thoughtful attention. In almost any stone or brick building, for that matter, after a storm, it may be noticed that under all of the windows there is a place which remains damp long after the other parts of the building have become dry. This spot is usually the width of the sill under the windows and extends downward to the windows below. Then under the cornice supports, balconies and other projections the same thing will be noticed. When these damp places are dried it will be seen that those which were so long in drying are much discolored, and an examination of the stone will show in most instances that it is more or less affected by decay. When we consider that this is the case in buildings which have been built only a few years we may well ask what will be their condition when a hundred years have passed. A stone or marble building should be so erected that this length of time will find it in good condition. The question then arises, in what way can we build our structures that decay will not show itself in a few years? This is one of the most trying climates known. The rapid and severe changes of the weather subject building materials to many alternate thawings and freezings which cannot but affect their durability. The necessity for giving the matter of the preservation of these materials careful consideration is then more apparent. That this should be the work of some considerable number of people need not be argued, An isolated attempt now and then will effect little, while experiments by government or other commissions would gain more in a short time than individual effort would in a century.

Much of the responsibility for the decay of our best structures rests with the architects. Where stone is properly selected and the construction is good, there is much added to the life of the building. Many architects do not exercise knowledge and care in the selection of the stone to be used in various parts of the building. Soft porous stone may be used in parts not exposed to the weather and answer every purpose of a harder variety, which, if used in the more exposed parts would show decay in a few years. It is perhaps useless to speak of seasoning stone before it is used. That is a habit of the olden times which is now out of date, probably to the disadvantage of our buildings. Two thousand years ago, Vitruvius recommended that stone should lie two years before being used to allow its natural sap to evaporate, and also that it should be tested as to its wasting. Sir Christopher Wren required that the stone used in St. Paul's Cathedral, of London, should lie by the sea beach three years before being introduced into the building. At the end of this time the proper blocks were selected. That this plan would affect the life of the buildings in this country there is little doubt.

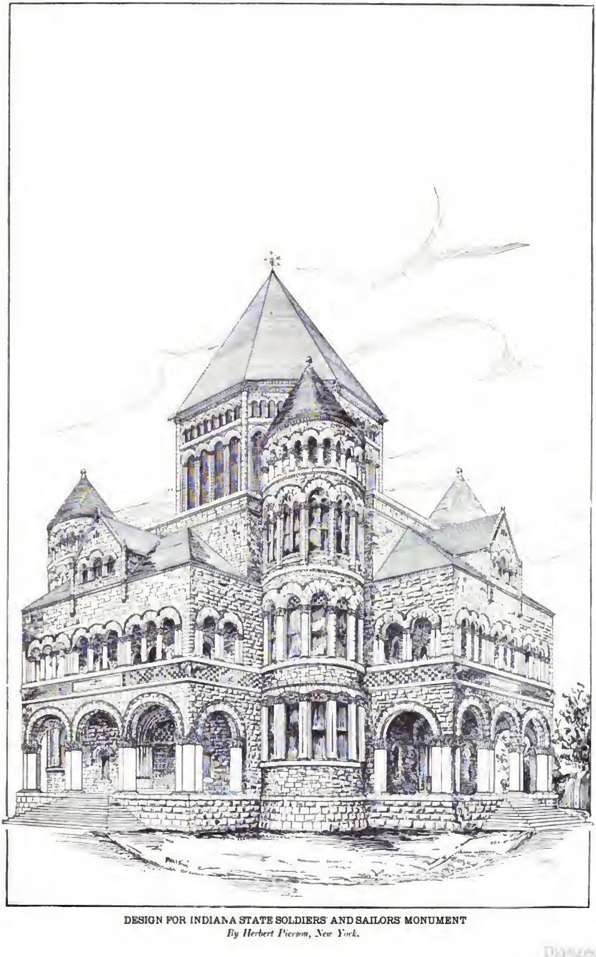
Perhaps the most important consideration is the kind of stone selected for coping, parapets, window sills, cornices, and other projections of this kind. Such projections are exposed to moisture more than other parts of the buildings and should be selected of a hard, fine-grained stone whose absorbent power is not great. Stone used for these purposes should be carefully tested. Granite which absorbs more than one-half of 1 per cent. of its weight is open to suspicion. A sandstone weighing less than 135 pounds per cubic foot and absorbing more than 5 per cent. of its weight of water in twenty-four hours should be used for other purposes. There should never be used for any projection a stone which has not been fully tested. Again, a soft stone should not be selected for carving because of the greater ease with which it can be worked. The very nature of the carving renders any stone more liable to decay, presenting, as it does, crevices which will hold moisture longer than any other way of using stone. The life of carved stone is shorter than one which presents a plain surface. The form of the protection is an important consideration. The following from *The Architect*, England, is pertinent to this point:

"In this climate water will invariably accumulate upon an exposed projection, and from thence by natural laws of gravitation will run downward upon the surface beneath. * * * The continued permeation by water must materially injure the durability of any structure. Upon brick and stone, especially in winter, is this effect noticeable, when the repeated alternate freezing and thawing rapidly affects the quality of materials, and by a disintegration of particles impairs the strength of the entire mass. * * * All projections from a building exposed to the weather should be throated, that is, a narrow groove should be cut, extending the entire length upon their under side. The water gathering upon the upper part of the window sill, or whatever the projection may chance to be, flows over the upper edge to the lower and to the under side of the sill, when, instead of following the surface by the attraction of cohesion and finally running down the wall, it is stopped by the groove, and from thence falls to the ground, being unable to further continue its progress upon the surface. The complete efficacy of this device and the ease with which it is adopted are most apparent, and though it has long been in use, it is rarely introduced among the specifications of an architect."

That these precautions apply with greater force to our more trying climate is evident. We have already noticed the damp place which shows itself under the windows and other projections of many of our stone and brick buildings and the decay which follows this frequent moisture. The householder might materially help this state of affairs were the window sills to be brushed of snow with the same care that the sidewalks are cleaned of the same obstruction. The free use of a brush would improve the appearance of the fronts of many of our best buildings and lengthen their usefulness while it would add but little to the cares of the householder.

Another place in which an architect can add to the usefulness of a building is in requiring that stone should be placed on its natural bed. Trinity church, in New York, probably owes much of its present state of preservation to the careful consideration of this feature, while other more recent structures where this has been neglected are even now falling into decay. Where stone is laid in its natural bed it absorbs less moisture and is thereby less affected by the sudden freezing and thawing.

In regard to artificial means of preservation, we shall say but little. There have been innumerable things tried for coatings which will render the stone impervious to water, but the best of them only last a short time and must be renewed. Where even a small part of a stone is exposed to the weather through a failure of the artificial coating, decay immediately sets in as if nothing had been done to prevent it. Among the material used for this purpose we may mention coal tar, paint, oil, paraffine, soap and alum solutions, beeswax and rosin, as organic preparations.



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Water-glass, potassium or sodium silicate (known as Kuhlmann's process) can be applied only to soft limestones and marbles. The stone must be colored first to prevent discoloration. This was applied to the new houses of Parliament, London, to the Louvre and cathedral, of Notre Dame, at Paris, the cathedral at Chartres, etc. This solution was applied to St. Charles cathedral in Vienna, Austria, which was fast going to destruction, and the decay was apparently arrested. Another method known as Ransome's process, is composed of water-glass and chloride of calcium, or of barium. There are various processes, none of which appear to fully answer the purpose for which they were intended, although some considerable benefit may be derived from their use. It is possible that comprehensive investigation would develope a proper and low-priced preservative. In such a case our soft stones would prove as valuable as the finer-grained ones, in that they would be more susceptible to the influence of the solution. But until such a preservative is found the life of the building must depend on the precautions of the architect. The proper stone must be selected, the best construction used and the stone laid on its natural bed. These means would prevent the stone becoming water-soaked to so great an extent as where no precautions are taken.

THE OLDEST ROCKS.

Oldest of all the formations known to geologists, and representing perhaps the earliest rocks produced after our earth had ceased to be a molten mass, are the hard, crystalline, and much contorted rocks named by the late Sir W. E. Logan, Laurentian, and which are largely developed in the northern parts of North America and Europe, and in many other regions. So numerous and extensive, indeed, are the exposures of these rocks, that we have good reason to believe that they underlie all the other formations of our continents, and are even world-wide in their distribution. In the lower part of this great system of rocks, which, in some places at least, is 30,000 feet in thickness, we find no traces of the existence of any living thing on earth. But, in the middle portion of the Laurentian, rocks are found which indicate that there was already land and water, and that the waters, and possibly the land, were already tenanted by living beings. The great beds of limestone which exists in this part of the system furnish one indication of this. In the later geological formations the limestones are mostly organic; that is, they consist of accumulated remains of shells, corals, and other hard parts of marine animals, which are composed of calcium carbonate, which the animals obtain directly from their food, and indirectly from the calcareous matter dissolved in the sea-water. In like manner, great beds of iron ore exist in the Laurentian; but in later formations the determining cause of the accumulation of such beds is the partial deoxidation and solution of the peroxide of iron by the agency of organic matter. Besides this, certain forms known as *Eozoon Canadense* have organized in the Laurentian limestones, which indicate the presence at least of one of the lower types of marine animals. Where animal life is, we may fairly infer the existence of vegetable life as well, since the plant is the only producer of food for the animal.—*Sir. Wm. Dawson, in Popular Science Monthly.*

First Irishman—"It's all pinsion, pinsion nowadays, Moike. The papers say there's a thousand survivors of the Mexican war, with twelve thousand widdies, afther drawin' pinsions this blessed day!"

Second Irishman—"The owld Mormons! Twelve widdies to every one o' them! That's phwat becomes uv the surplush!"

CLEANING METAL AND STONE WORK.

During the year 1886 the masonry and ironwork of the Madrid and Baudin bridges at Paris were thoroughly cleaned by Messrs. Mathieu and Peigne, who work the patent processes of Mr. Liebhaber. These processes, which are purely chemical in their nature, were at first applied solely to the cleaning of limestones, but in these bridges materials of a very different nature were successfully dealt with. The surfaces to be cleaned, as described in *Engineering*, are submitted to the action of a jet of mixed hydrochloric and sulphuric acids, and left for two or three hours, when they are well brushed, and finally washed down with a water jet, which completes the process. In the case of limestone masonry, the hydrochloric acid unites with the calcium, forming chloride of lime, which is then decomposed by the sulpuric acid forming a calcium sulphate, this being precipitated on the face of the stone, and containing all the impurities, which are then removed by the action of the brush and of the water jet. In many cases this acid treatment will not succeed unless the stone is previously prepared, as the masonry frequently becomes coated with a black and shining deposit of all the impurities contained in the atmosphere of a large town, which entirely prevents the acids reaching the stone.

In this case Mr. Liebhaber before applying the acids, covers the stone with an alkaline paste, consisting of a mixture of carbonate of soda and calcium hydrate, which he has named "tolugene." This paste is spread over the face of the masonry with a trowel, to a thickness of from ½ to 1 mm., and left there for from three-quarters of an hour to an hour, when the excess is quickly washed down and brushed off, and the acid applied as previously described. In cleaning ironwork the "tolugene" alone is used; it is spread over the work either with a trowel or brush, and in the course of an hour or so will have united with all the oil of the paint, leaving the red lead on the work in the form of a dry powder, which can be easily washed off with a jet of water. The metal is said to be cleaned much better than by the older method of burning and scraping off the paint. For cleansing brickwork Mr. Liebhaber makes use of the property which hydrofluoric acid possesses of separating the silica from silicates. The work is first painted with a solution of ammonium fluoride, and this immediately afterwards is treated with a jet of concentrated sulphuric acid, which liberates hydrofluoric acid *in situ*, and this immediately attacks the silicates, robbing them of their silica. The whole surface is afterward thoroughly washed with water. With regard to the cost of the processes, a total of 502 square yards of masonry, of which about 165 were sandstone, were treated at the Madrid bridge at a cost of from 13 to 17 cents per square yard, and brickwork at the Baudin bridge cost 17 cents per square yard, the prices including the cost of erection of such scaffolding as was necessary. With regard to the ironwork, the contract price was 20 cents per square yard for plain work and 31 cents per square yard for molded work, but the contractors are said to have lost money in carrying out this part of the contract.

It is reported that a lime-burning industry is to be established in Bridgewater, Aroostook county, Me., where large beds of lime rock exist. Warren Burlock, an expert from New Brunswick, has examined the rock, and is said to intend starting a number of kilns.—*Industrial Journal.*

The granite quarry at Addison, Me., recently opened by Messrs. Frank Thompson, I. S. Preble and A. G. Godfrey, furnishes employment to fifteen hands, who are turning out 1,000 blocks of paving stone a day.

THE CLEVELAND CONVENTIONS.

THE recent conventions of marble and granite dealers at Cleveland may be mentioned as appearing to be the nucleous of large and powerful organizations. We are aware that other conventions have preceded these, but without appearing to be critical, other than in a spirit of interest in their welfare, we would say that in the past the development does not appear to have been healthy. The organization of conventions, and the organization of men, in whatever form and for whatever purpose, requires distinct and practical knowledge and experience. A body of men in most instances, come together with a general idea of what they want to do. In the case of the granite and marble dealers who came together at Cleveland last month, it would appear that certain reforms in the trade are desired, and general benefits are intended; means looking toward the restraint of competition were sought. These general conditions were understood. The means of reaching the result were not so clearly defined. The lack of success which grows out of such effort is at times discouraging, and the most disagreeable feature in connection with it is that one blames the other. Really the blame is general. Those desiring to organize are not educated in the convention business; they are not educated as organizers; they mean well, but are not clearly informed as to methods. The nucleous of success in all such organizations is HARMONY. Harmony, in such cases, grows out of acquaintance and interchange of experience and appreciation of the fact that one may benefit himself by benefiting his neighbor, his competitor. There is every reason why general and personal acquaintance leads most directly to the proper result.

Among other things to which the Ohio convention committed itself was the general principle of District Organization. This means the formation of smaller organizations throughout the state, the coming together of competing dealers within a relatively small radius, and as a result a general local understanding growing out of the condition of local competition. The general principles of an undertaking of the kind are not different from the state and national organization. It brings together, however, competing neighbors, gives them a chance to discuss local conditions and arrive at an understanding growing out of their surroundings. Not only this. They become thoroughly well acquainted. There is social and business harmony, and as the result of many organizations of this kind the state organizations are built up, and as a consequence the national organization becomes powerful for good throughout the country. It is the business of the state organization, and as well the national, to cover the broad general principles, and leave the local details to the settlement of the local organizations, at the same time fixing certain general rules and principles which must control all action. Thus it is that the local societies have the backing of the state and national organizations, while the latter has the upbuilding and the upholding influence of the smaller bodies.

The more thoroughly people become acquainted with one another the less occasion they see for fear and distrust. Suspicion is born in ignorance and is developed in ignorance. We imagine that some of our competitors are dreadful fellows. We have never met them, but have heard that they are almighty shrewd, great schemers, and all that; and as a consequence we resort to various schemes ourselves to get ahead of them. Personal acquaintance and common understanding teach us that our competitors are made out of the same kind of material that we are, and are not such unscrupulous people as we suspect. Thus it is that organization, which brings all together with a common knowledge and a common understanding, is the great thing necessary to remedy the evils common to all trades. A friend of ours, in addressing a convention at one time, said: "In the nature of things I am brought in contact with most of the members of this convention, and a great many people engaged in this business. I have noticed that we are always talking about the tricks of the other fellows. I go from town to town and hear the same story repeated by different members of the trade as applying to one another. A tells how B gets ahead of him in some wonderfully irregular way. B tells how A gets ahead of him in exactly the same way, and so it goes. It is always the 'other fellow' who is doing wrong. Remember, my friends, that you are the 'other fellow' yourself. If you listen to the stories about the competitor whom you do not know you will hear a great deal that is not true and that little which is true is developed through the impression of the irregular qualities of that dreadful 'other fellow.'"

We believe that the marble and granite dealers of Ohio and other states are on the right track. They have a good deal to learn about organization, but they are traveling the right way to learn. Organizations have been formed under much more complicated conditions than those which surround this trade which have been wonderfully satisfactory and beneficial to all concerned.

There is a disposition among all organizations of this kind to prescribe too much during their early history. There are too many penalties. There is too great a disposition to be arbitrary when their strength is not sufficiently great to justify such means. The conditions must be general at first, and the details of smaller growth. The success which will come from the organization of marble and granite dealers will not come through their penalties, or through harsh measures. It will be the result of personal acquaintance, a general understanding which will belong to all alike, it must be the result of confidence. The first thing that is wanted is a large number of members. With this large number will come strength and intelligence. We believe that the conventions at Cleveland will result in more good through the interchange of experience there had than would result from any harsher measures. The big club must be swung by a large body. We are convinced these organizations understand this, and will profit through the knowledge. We think it is well that the conventions were no larger than they were, otherwise they would have been more difficult to handle, and there would have been less opportunity for harmony during this, the educational period. A larger body would have been unwieldy at this time for the reason that there would have been more quibbling about details than would have admitted of the consideration of more important general principles.

◆

Both in China and Japan soapstone has long been largely used for protecting structures built of soft stone and other materials specially liable to atmospheric influences. It has been found that powdered soapstone in the form of paint has preserved obelisks formed of stone, for hundreds of years which would, unprotected, have long ago crumbled away. For the inside painting of steel and iron ships it is found to be excellent. It has no anti-fouling quality, but is anti-corrosive.

◆

Angry customer (to Isaacstein)—"Dutchy, when I bought this suit two months ago you said it wouldn't fade. Look at the color now?"

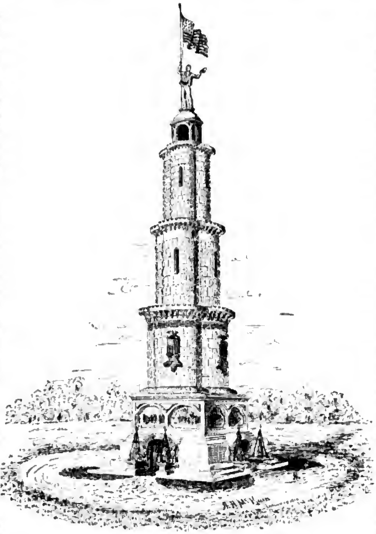
Isaacstein—"My frient, dot vas changed peautifully. I iron you dot suit for dhree tollar, und beebles will dink you choost bought a new von."—*Boston Record.*

◆

C. A. Russ & Co., granite contractors at Green's Landing, Me., have shut down rather than accede to the demands of workmen for monthly payments and a different scale of wages.

DELPHI MONUMENT.

HEREWITH we present the design for a soldiers' monument, to be constructed at Delphi, Carroll county, Indiana. As will be seen, the construction is in rough stone, quarry face and sawed beds. This monument will be finished sometime during the fall. It is designed by Mr. A. A. McKain, of this city.



MINNESOTA GRANITE.

THE quarries of Minnesota, like many other resources of that state, are but little developed. But what little has been done goes to show that there are large quantities of fine stone there. More than half of the state is underlaid by crystalline rocks of which granite is best known, but almost every variety of this general class of rocks is found here. They exhibit all degrees of value and durability for building purposes. In the northern part of the state, beyond the limits of settlements and roads, are to be found large exposures of a light colored granite of fine quality, but these rocks which are yet out of reach commercially do not present the interest of those which can now be used. Their value lies in the future. In the valleys of the Mississippi and Missouri rivers are quarries which have been worked to some extent. Their product is to be seen in the principal cities of the state as well as in some of the neighboring states. There is a gray granite quarried at Sauk Rapids which is very hard and durable. It was tested at Washington and found to resist a pressure of 15,000 to 17,000 pounds per square inch. The quarries at Sauk Rapids have been in operation the longest of any in the state, but their production is not equal to those at Watab. Here is found not only the gray granite, but stone in other colors. North of the place where the gray granite is quarried and separated from it by a distinct line about six inches wide is found red granite. The texture coarse and uniformly crystalline.

At East St. Cloud is found a massive archaen granite. It comes in three colors. The most prized is a fine grained gray stone. This was used for the trimmings for the custom house at St. Paul. A red variety is also found here. The stone is very hard and causes the quarrymen some trouble to extract it.

There is at Duluth a stone which is called granite, but belongs to a very different class of rocks. The term "Gabbro," which came from Italy, is more properly applied here. In this stone quartz is altogether wanting, the stone being composed of feldspar, abrodite, augite and a magnetic oxide of iron. These materials are all softer than quartz, and it is somewhat strange that Duluth stone should be popularly considered as harder than granite proper. The stone is firm, tough and compact and perfectly crystalline in character. In some places the oxide of iron becomes so plenty as to spoil it for building purposes, and to attract attention to it as iron ore. The strength of the rock is about 17,000 pounds per square inch. It has not been used to any great extent for building purposes on account of the difficulty of quarrying and dressing it.

NATIVE LITHOGRAPHIC STONES.

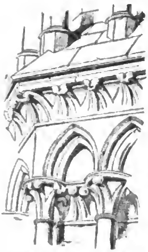
The Philadelphia *Ledger* announces the reported discovery of "perfect lithographic stone in large sheets within a hundred miles of Austin, Tex. The only source of supply of these stones heretofore has been Bavaria, where the mines have long been worked, and where it is believed the supply is gradually becoming exhausted. If the reports from Texas shall be confirmed by the production of large and perfect sheets of stone, another important industry will add to the prosperity and development of the new south."

SALT IN BUILDING.

The use of common salt appears to be of increasing importance in connection with building materials. Among the carpenters the article is now found to be an aid in the heating of glue, and where, as has been usual in joiners' and cabinet-makers' shops, the glue is melted in a jacket kettle, surrounded by water, it is said to be an improvement to place salt in the water in the outer kettle—that is, the addition of salt raises the boiling point, and therefore enables the glue in the kettle to be kept at a higher temperature than could be maintained with water alone, and this is advantageous to the work. Again, masons find their use for salt in adding it to cement mortar in cold weather to preserve it from the injurious effects of freezing. It is known that in many cases masonry has been laid in cement in cold weather, using a considerable proportion of salt in the mixture which, after repeated freezings and thawings, has remained in perfect condition, while work near by laid in mortar of the same kind, but without any admixture of salt, became disintegrated by the frost.—*Age of Steel.*

At Louisville, Ky., July 8, Peters & Burghadt's marble and stone works were damaged $40,000 by fire; insurance, $15,000.

USEFUL DETAILS.



THE work of this journal is architectural only in a detailed way. It is only occasionally that we will be called upon to present views of completed buildings. This cut represents a fragment from a French cathedral at Coutances. It is from the period of early French gothic, probably the latter part of the thirteenth century. This piece of detail is from the pinnacle on the stair turret of the north transept. They are the round caps which so clearly distinguish the early French from the early English, and as well the more rounded arches of the French gothic of the same period. There is less to it that is angular. There is more of the softness and richness of form which belongs to the more Southern country in all matters of art. There are details here, moldings of caps, bases and strings which cannot fail to be of interest to any conscientious stone-worker.

NORTHERN OHIO SANDSTONE.

THERE are several different deposits of sandstone in Ohio of which the Berea grit is probably the most valuable. Cuyahoga shale is a deposite about 300 feet in thickness, mostly of blue argillaceous shale which contains in many places scattered courses of great value. In Southern Ohio these are concentrated and become very valuable. The Logan group of sandstone is alternated with conglomerates in Central and Southern Ohio. The thickness of the deposit is 100 feet. We may mention the Waverly conglomerate as a member of this group. Berea grit is the great quarry rock of Northern Ohio. It outcrops at Williamsburg, Ashtabula county, in the northeast corner of the state, extends westward in a belt into Erie county and from thence goes south until it reaches the Ohio river in Adams county. The deposit is from ten to seventy-five feet in thickness consisting of heavy layers with often a deposit of thin broken rock on top, which is called shell rock. While this external covering is often of little value in some places it is even, unbroken and compact and is used for paving purposes.

The stone which is quarried in Ashtabula county is not valuable as a rule for building purposes. There is contained in its deposits of iron pyrites which cause it to become discolored upon exposure to the weather. Where such stone is used, it will often not only become discolored itself but cause other clear stone under it to be affected. However, this stone is used extensively for bridge construction and any heavy masonry.

South of Ashtabula county, in Trumbull county, there is found very valuable paving stone. The quarries here are remarkable for the evenness of their bedding. Blocks 1½ inches thick and 10 feet long are extracted upon which a straight edge would touch at every point. Thin slabs are so strong that they are used without testing or question. The layers, while they are pressed very closely together, seem to have no more adhesion than a pile of lumber. The stone is even, fine-grained and wears in a uniform manner. These flagging stones are also found to the west in Cuyahoga county.

Much of this sandstone is made into grindstones of superior quality. That which can be used for grinding clock springs is of especial value. Those made from the stone around Independence are said not to glaze when used for dry grinding, and many, for this purpose, are made there. The stone about Independence is only thirty to forty feet in thickness. At the top is found a layer of ten feet of good rock. Below this is a layer of from three to twelve feet of worthless rock, and below this again good stone which is valuable for building purposes. This has been little quarried on account of the cost of removing the stratum of poor rock.

The largest sandstone quarry of this region is at Berea. The stone is taken out for both building purposes and for grindstones. The stratum is here from sixty to seventy-five feet in thickness and has been quarried over an area of forty acres. There are very few places where the bottom of the deposit has been reached, the excavations averaging forty feet in depth. This rock is blue gray in color, soft when quarried and hardens on exposure. The bedding is very even the rocks being from two to ten feet in thickness, and joints occurring very seldom. The stone is an excellent building material if care is exercised to obtain that which has no sulphide of iron in it, which is carefully done at the quarries. It is considered among the best Ohio sandstone for bridge building on account of its great strength. Tests made have shown that a 1½ inch cube will withstand a pressure of 15,400 pounds. The stone has been used throughout the country and many buildings of note in Northern Ohio may be shown as built of this stone.

The Berea grit of other localities differs very little from those mentioned. There are many quarries the product of which is used according to quality for flagging, grindstones and building. The stone varies in coloring in different places as well as in quality, and the layers are uniformly even and firm.

FIRE-PROOF BUILDING STONE.

JOS H. BRINTON

THE archean, or primitive rocks which underlie all stratified formations are the only fire-proof building stones. These having formed the floor or first covering of the primeval earth, antedate the granites of the New England states. They appear as outcrops on the extreme eastern slope of the Allegheny mountains, near the Delaware river, in the county of Chester, Pennsylvania. Being the oldest, and most indestructible of all known rocks, they are consequently of great value for building purposes. The following description, taken from the report of the tenth census, embraces the best known varieties:

"Serpentine is becoming more and more popular as a building material. The Chester county stone has attracted much attention in many quarters; quite a number of important buildings, have been constructed of it in Philadelphia, Washington and Chicago. The stone is apparently very durable, and buildings in the neighborhood of West Chester, which have been erected over one hundred years, are fresh and maintain their attractive color unchanged; the stone is easily worked, and it is claimed that it can be furnished ready cut at smaller cost than almost any other stone at the quarry."

"Hornblende granite or syenite, lies in huge natural blocks, sometimes weighing thousands of tons; it splits well in two directions, and is obtained in regular sizes by plug and feather; its indestructible nature, and the fact that it may be quarried in blocks of any required dimension, makes it a very desirable material for building purposes."

"Biotite granite or mica stone, lies in sheets, sometimes horizontal, sometimes vertical, splits very regularly in the direction of the lamination, and is conveniently wrought into regular blocks. It is extensively used in Philadelphia and vicinity, and presents a very pleasing appearance."

ORGANIZATION.

THE monument business has ceased to be the art that it used to be. It has become a mechanical business with those who are workers in marble and granite, and the art is now to sell the product. That part of the business has been a little off color in the recent past. It needs regulation; the greatest sufferers are those who have to deal with local competition. We have to protect ourselves against ourselves. Dealers in marble and granite will do themselves great harm in not joining themselves together. As their trouble is largely with local dealers, one against the other, local organization is most necessary, and as such organization is only strong when it has a powerful backing, it must be allied to state and national organization, which if it be strong enough can be all-powerful in controlling the wholesale as well as the retail dealers. The following is from the speech of a very successful organizer in the milling business of this country. It may not be known that in the milling line, over-production has been carried to a point which is probably not realized in any other line of business. At the same time organization is making it possible for the millers to do business on a profitable basis. The millers have organized under the most discouraging of circumstances, internal dissensions, ignorance, prejudice, bankruptcy, pride, combining for self-interest. Yet, through fear of one another, they have come to see and realize the benefits of organization. This is what **Mr. Seybt**, of the **Millers' National Association**, had to say:

> Some fifteen years ago, I had a competitor in my town with whom I used to live in the usual style of two millers in one town. We would not look at each other when we passed on the streets He would look one way and I would look the other way. We called each other all sorts of names; we belonged to different political parties; we were just diametrically opposed to one another. We finally sued each other, and we fought and fought until there was not much left of either of us. To-day, gentlemen, those very parties and I work closely together and have been doing so for years. When one wants to make a sale to Europe or any other point, the telephone rings and one will ask the other, "Say, I have got such and such an offer; do you think I had better take it or wait for a better price?" We have the same wheat and we have the same market, but we get along together the very best kind. We used to tread on each others' toes continually, but for the last six years we have made our prices of wheat together. Just last week we formed a joint stock company and appointed a manager to buy wheat for us in a certain territory, and one day they get a car-load and the next day we get a car-load. And so it goes right along without any friction or misunderstanding of any kind. That just simply shows what organization will do.
>
> I met that same miller the other day—by the way, he is an uncle of mine—and I said to him. "How much money would you want to bring back the old state of affairs?" "Well," he said, "it would take a good many thousand dollars a year before I would be willing to abrogate the pleasant arrangement we now have." I know that we have paid at least $1,000 less at each mill each year than we would have done under other circumstances.

The same gentleman had some strong suggestions to offer in the matter of local organizations, and as the words of a successful organizer, we quote:

> Now, how to get at it. I would advise that you select different localities in the state; each man can tell exactly how far his own territory extends. Use lines drawn from east to west or from north to south, or in a certain territory bounded perhaps by a river or a railway on one side or the other. Those who have the same sources of supplies and the same market should come together. You can fix up matters so that they are fitted to the northern part of the state and to the southern part of the state. Divide the state into districts with defined boundary lines, and keep them to yourself. Get only such millers together as have about the same sources of supplies, and who have about the same markets. Then you bring them on a level. Then every move you make hits a point of vital interest to yourself and everyone with you, and every time you make a point it possibly will, and virtually, covers the whole situation. We have tried it in other states and we find that it works the best in that way. You must have a man in each district to take hold of it, and he must make up his mind that he will not rest until his district is in shape And you will find when you first go to work in earnest that it is much easier than you imagine.

There is a disposition as soon as a member drops from grace to throw up the sponge ourselves and say that organization is no use and do all we can to disturb the general result. This is what causes more trouble than anything else. For instance, an organization is formed, certain rules are made and before they are fairly printed some one breaks over, and the next thing is that a half dozen or more slop over. They say: "What is the use of organization anyhow? Here we come together and we have no more than separated than the rules are broken." As a result a large number jump in and break all the rules they can. This looks like a childish piece of business, but it is common, nevertheless. Here is what our friend, the organizer, has to say about this business and other matters in connection with it.

> You will find if you have organized in that way that it will work all right. But don't knock the whole business over because some brother has been waivering a little. Go to him and say to him, here you didn't do quite right there; let us try and fix it up again; let us try and be right again. Show a little Christian spirit in that way. The man who has done wrong, if he is talked to properly, will feel ashamed of it and not do it again. You try that and you will find it works very pleasantly indeed.
>
> Then when these districts are organized in that way you will find it of very great advantage. Have one district follow another like links in a chain, and you will find they will all pull together. Of course, your state organization must in the end be the head of these local organizations. If any of the districts get to quarreling between themselves, not the individuals, but the districts, then the state must step in and take up the matter; and above that must be the national organization to take up any disputes that may arise between the state organizations.
>
> There are always men who like to be leaders. Such men must take hold of it in each district and then it will be successful undoubtedly.

All this is the result of experience. It is the outgrowth of results. No theoretical argument can be made against it. Then again, when one looks at it, it is sensible and all right. It looks so on the face of it.

⁂

We have had considerable to say this month about organization, and in direct reference to the organization of marble and granite dealers. Nothing that has been said could possibly misapply to any line of the stone business. We commend the matter presented to those who seek defense from their neighbors, and it is from such that the greatest defense is necessary. The stone-men in all branches of the business may profit by that which is set forth as relating to the special instance to which we particularly address ourselves.

HINTS ON SELECTING ROPE.

A German paper, in an article on the present methods of rope manufacture from hemp, and the determination of the different qualities and probable strength simply from the appearance, lays down the following rules: A good hemp rope is hard but pliant, yellowish or greenish gray in color, with a certain silvery or pearly lustre. A dark or blackish color indicates that the hemp has suffered from fermentation in the process of curing, and brown spots show that the rope was spun while the fibers were damp, and is consequently weak and soft in those places. Again, sometimes a rope is made with inferior hemp on the inside, covered with yarns of good material—a fraud, however, which may be detected by dissecting a portion of the rope, or, in practiced hands, by its behavior in use; other inferior ropes are made with short fibers, or with strands of unequal strength or unevenly spun—the rope in the first case appearing woolly, on account of the number of ends of fibres projecting; and, in the latter case, the irregularity of manufacture is evident on inspection by any good judge.

"James," said the undertaker, "it is about time to close the shop. Have you heard of any change in the condition of Mr. Simpson since noon?"

"No, sir," replied the boy, "except that they've just turned off the doctors and called in a Christian scientist."

"James," rejoined his employer, shaking his head gloomily, "we will keep the shop open half an hour longer."—*Ex.*

BORDERS.

We add to the selection of borders which were given in last month's Stone. Those which we here present are, if anything, more simple than those formerly given. No. 15 is another of the zig-zag patterns, to which reference was made in the former article on borders. No. 12 and No. 9 show the resources of this same idea. The latter hardly betrays the zig-zag form, though a little thought will indicate its development from this form. No. 10 is only a slight departure from the same scheme. There is a bare suggestion of a decorated zig-zag form in No. 17, though the departure is somewhat greater than in any of the others mentioned. Nos. 13, 14 and 11 are suggestive of foliated patterns, though No. 14 is the most pronounced. All are bright and attractive, and none are complicated. It may be borne in mind, as we have said before, that it does not cost any more to cut a pattern that is pretty and artistic than one which is ugly and clumsy. It is largely a matter of discrimination and freedom from pride. There are a person great many self-conscious who wish to do what they call original work. They like the to make what they call original designs. It is usual with such people that they are without the proper qualifications to make successful copies, even to say nothing of doing original work. It may be known that the most successful designers are those who have the fullest knowledge of the past. Also, that the most unsuccessful, the crudest and clumsiest of them all, are those who lay claim to originality, and show a disregard for the good things that have gone before.

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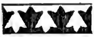

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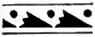

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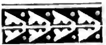

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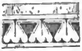

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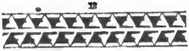

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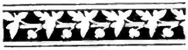

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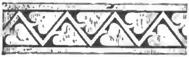

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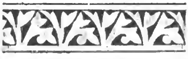

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KASOTA STONE TESTS.

Locality, Kasota, Le Sueur county, Minn. Kind, Shakopee. Formation, arenaceous dolomitic limestone. Color, fawn or light pink. Specific gravity, Professor Dodge, 2.64; Gilmore, 2.52. Weight, 157.4 cubic foot. Strength, 2 foot cube, edge, 67,000; bed, 74,000.

COMPARISON WITH GRANITE.

10 is perfect.

	Granite	Kasota.
Crushing bed	10	7
" edge	10	7
Absorption corrosive vapor	10	8
" moisture (7 weeks)	10	5
" water (4 days)	10	10
Frost effect (8 weeks)	10	10
Loss of weight from frost	10	9
Effect dry heat to white heat	10	7
" water on heated stone	Slightly cracked	
" corroding vapors	10	9
Facility of dressing	5	6

Above are scientific tests, practically, the quarry owners differ slightly from above. Dressing should be 4 to 10, or 2½ times as hard for granite.

CORRESPONDENCE.

CORRESPOND WITH US!

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

Italian vs. Vermont Marble

To the Editor of Stone.

Sir: We received the July number of Stone, and after looking it over, we feel pleased with its general appearance and tone, but we notice one great error in the article "What is Marble?" especially that part which treats of Italian and American statuary. The author (?) could not have had any practical experience with either stone or else he would not have such an error. You say: "There is now found in Vermont a marble which in color and fineness of grain equals that from Italy." Statuary marble has been found in Vermont for fifty years. It resembles Italian in color only, not in grain. You say: "However, the Vermont marble is not so valuable for statuary use on account of being harder and more brittle than that from Italy." Just the reverse. The only objection to the Vermont statuary for fine sculpture work is its extreme softness, and what makes the Italian the most valuable is its extreme toughness and closeness of grain, so that in carving you can work it to the finest point with perfect ease. You say: "It is thought, that when the quarries have been worked longer, and the marble is obtained lower down, that marble softer and less brittle will be obtained." The quarries are too deep now for the marble to improve. All stone has a tendency to change its character, as the quarry deepens, and those in Vermont are no exceptions to the rule. You say: "For statuary use it is desirable that the stone should be soft when first quarried, and should harden on exposure." The author must have had some other material in his mind when he wrote that, and also that "that is the case with that from Carrara."

You must pardon us for writing such a letter, but seeing the article, and such a great misstatement, we could not pass it without a protest. We hope you will accept it in the spirit intended.

Yours, Stevenson & Blew.

New York, July, 18.

The article in question was an extract from a bound volume and should have been so credited. We are inclined to belive it truthful as to the circumstances of the time during which it was written, but of course not at the present time in every respect.

From Oregon.

To the Editor of Stone.

Sir: The May and July numbers of Stone came all right, (June missed me,) I like it very much and think you will work it into a publication that will be what every worker in stone and every contractor will want.

I received a letter a few days ago from Prof. J. S. Diller, of the United States Geological Survey, who is now on his way to this coast, the letter was published in one of the papers here. I will send you a clipping so you can see what is thought of my sandstone. After he makes an examination of the stone in place, I will write you again.

I should think it would be of enough interest to the United States government to test stones from different quarries free to find out the best building stone for the government building being put up in different parts of the country. The great testing machine at Watertown, Mass., made by Mr. Emory, could be put to good use in that way. I would like to have some tests made of the stone from my quarries better than I am prepared to make here.

I will with pleasure give you an occasional letter descriptive of the different stones found in this part of the country, also of the stone trade here, although that will likely be but little for some years to come, until the people become convinced that it is more profitable to expend a trifle more in substantial material for building purposes.

Please find two dollars inclosed, one year's subscription for Stone and I wish you the greatest success in your enterprise, and that you many get an immense subscription list, as you deserve to do.

Yours truly Frank Wood,

Albany, Ore, July, 12.

◆

"Put on some more clothes, Mandy?" shrieked the elderly aunt at the watering-place; "folks'll see you!" she added, horror-struck.

"Aunt Julia," replied Amanda, as she went out among the waves with all the trustful innocence of a Texas statesman, "what are we here for?"—*Chicago Tribune.*

MEMORIAL SCULPTURE.

IN our last number we referred to the inartistic and grotesque memorial sculpture common in English-speaking countries. The above sketch, with its innumerable counterparts in every old churchyard, appeals nowadays rather to a sense of humor than to religious veneration, and it is difficult to understand the austerity of imagination of an age that could conceive such specimens with reverence for the memory of departed friends. Yet a casual walk through the finest and most modern of American cemeteries will disclose multitudes of forms that are as fantastic, if not as grim, as our leading sketch.

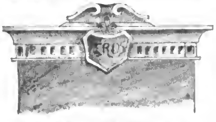
Imagine copies of the great obelisks, and shafts a couple of feet high, and as thin as a fence post, usually surmounted by an urn, a lamb, or a piece of statuary, executed with cheapness and despatch. Columns that would be majestic were they large and high, are repeated in miniature, and covered with a wealth of creeping vines or stone drapery borrowed from the pall but all florid in design, and very often stiff and runic in execution, owing to the cheapness of the tablet and the uncultured taste of the designer.

The tablet form of monument, which for convenience will include all slabs, shafts or columns, is not subject to many variations from horizontal and converging lines and smooth surfaces without destroying the conception of repose and solemnity that are of the first consideration for the memortial, and these sentiments will be fairly conveyed in these forms if their simplicity is not destroyed. Neither of these attributes can be well expressed with mere ornamentation, of whatever kind; and where ornament is sparingly used, as it should always be, it should express emotions pertinent to the subject and indicative of the night side of nature. Otherwise a agy and festive appearance will result that will always strike the beholder as incongruous and in bad taste. Where a pictorial emblem may be employed, it should be used for its expression rather than as an embellishment, and not be employed when its application is not popularly understood. Properly used, these will often enhance the sense of melancholy veneration or repose they may typify. But it is just here that the popular taste fails. Living emblems are usually chosen, and in order for these to inspire an emotion, the emotion itself must be pictured in the sculpture, and this requires a genius for execution that is so rare and expensive as to be almost entirely beyond the conditions of the cemetery. The winged globe of the Egyptians, or the urn of the Etruscans have found a wide application, and a series of these symbols are popularly known, and if used with taste are generally appropriate.

But great art is required in their use. The winged globe that was the sole adornment of the classic specimen, we reproduced last month, would have lost half of its force had the design been overloaded with superficial ornament. Indeed, a very little ornament added would have destroyed the simplicity of the whole monument. The effect in this case was to strengthen the broad, smooth surfaces and severe outlines by the effect of contrast, and it may be taken as an axiom that ornament should be used only for the purpose of contrast; beyond this effect the ornament will weaken the entire design, and inspire a sense of triviality, at least in so far as the work we are discussing.

Simplicity in outline and chaste subordination of ornament have always won the admiration of men. The temple of Theseus, on the Aeropolis, at Athens, has been given the apex of good taste in architecture for twenty-five centuries. The obelisks of Egypt have been removed to the corners of the earth as standards of monumental taste, while many hundreds of ornamental standards have succeeded each other only to be discarded as specimens of diseased taste, and historically due to an infusion of barbaric races and customs that invariably give way before higher culture and civilization.

Unfortunately because of considerations of cost, the best specimens of endurance and repose require massiveness as well as proper outlines, proportions and ornamentation. The obelisk two feet high may have exquisite proportions, but it excites ridicule because of its insignificance. One of the most expressive monuments we ever noticed was a massive cube about eight feet in dimensions, absolutely without a line or ornament except the family name, cut on one of its faces. A giant bowlder with its simple inscription, marking the resting-place of a hardy Western pioneer who had fallen by the wayside, was infinitely more touching than a multitude of little columns, or shafts, hung with misplaced drapery, and topped with little lambs, useless urns and baskets of colorless flowers.



PIEDMENT—ROMAN RENNAISSANCE, 13TH CENTURY.

Not that forms from life will not appeal to the deepest emotions and most solemn impulses. Indeed, this is the very highest form of all expression. But meaningless forms and unfavorable methods of placing them upon slender little shafts detracts from the symmetry of the shaft while adding nothing to the intrinsic merit of the sculpture. Forms from life must have the semblance of life, and must depict emotions, passions and conditions—otherwise they are meaningless, and even repulsive. Besides, they should be displayed upon bases or pedestals, or from niches appropriate to the subject, and not upon apexes or finials, that suggest anything except majesty or stability.

It must be said that cost is in the way of a general use of the quality of massiveness, and stultifies popular taste by compelling it to seek minor forms of expression. But even the cheaper and smaller stone may be given a dignity by avoiding barbarous ornament and the use of a few well-chosen lines for a purpose of adding by contrast to the restful effects of broad surface and simple outlines.

The above reproduction of a piedment from the early rennaisance, is one of the few forms whose simplicity in outline admits of a popular application for memorial purposes.

* * *

"Who is that man?"

',He's the servant of old Smith, the undertaker."

"Ah! then he's the valet of the shadow of death."

TRUSTS.

A TRUST is defined as being a combination of many competing concerns under one management, which reduces the cost of and regulates the amount of production, and increases the price for which the article is sold. A trust may or may not do this latter thing. The object of the sugar refiners, trust are set forth in the following words:

"First, to promote economy of administration, reduce the cost of refining, thus enabling the price of sugar to be kept as low as is consistent with reasonable profit.

Second, to give to each refinery the benefit of all appliances known or used by others and useful to improve the quality and diminish the cost of refined sugar.

"Third, to furnish protection against unlawful combinations of labor.

"Fourth, to protect against inducements to lower the standard of refined sugar.

"Fifth, generally to promote the interest of the parties hereto in all lawful and suitable ways."

The above is from the articles of the sugar trust agreement.

The use of the word trust with the public suggests an unpopular significance. To the public a trust is sometimes that is antagonistic to freedom. It seems a monopoly, which to all outside of monopolies is unpopular. No man likes any monopoly but his own. He does not like other people's monopolies. Trusts are becoming stronger every day. The science of combination has progressed during recent years. The formation of pools was a step in that direction. For years it appeared that a perfectly tight trade combination was impossible. The formation of pools and agreements wherein the whole work was not under a single control were unsuccessful. The trust is formed something after this manner. The various establishments incorporate and then turn over the stock to certain parties called trustees. The trustees issue trust certificates, and generally each party receives a bond secured by mortgage on his own establishment. The trustees have exclusive control over all of the concerns which are included within the trust. They have power to close one or more of the establishments. They limit production, consolidate the different establishments and fix the price of the product. The various parties whose establishments are closed are not injured, for the reason that their profit comes from the whole trust and not from the establishment of which they were the original owners. It virtually means a centralization of the business. The purpose of giving each party a bond secured by mortgage on the manufactory or property of which he was the original owner before putting it in the hands of the trustees is to give him a lien on his former property. It will come back to him in case the trust turns out to be a failure. In general terms the above is the outline of the most popular method of forming a trust.

Another way is for each of the parties to lease his manufactory or concern directly to one central corporation. Still another method is for a corporation to purchase the stock of the various smaller corporations, giving a bond and mortgage in payment. Another way of forming a trust is by having one central organization which purchases all of the product of the various establishments. Each party contracts to sell his whole product in this way. Another kind of trust is where no corporation is involved. The manufactories or concerns combining are conveyed or leased to trustees, who issue certificates, and sometimes bonds secured by mortgages, in payment thereof. The first trust scheme proposed, however, is the most popular.

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The Standard Oil Trust is the best known of all trade combinations. It is understood more as a trust or monopoly in the abstract, rather than in detail and for its active work. It is merely known that it has made large sums of money and at times has used a heavy hand. It is probably true that the products of petroleum are cheaper to-day than they would have been without the standard oil trust. Their mechanical and business methods are so perfect that the cost of everything has been reduced to a minimum. The volume of business is so large that they can afford to spend large sums in making a comparatively small saving on a moderate quantity of product. They have carried their business into everything pertaining to petroleum products, and have purchased the best skill in all departments of their work. They have been enabled to reduce the cost of a barrel from $2.50 to $1.25. By the use of tanks, tank cars and pipe lines, they have been enabled to dispense with the use of millions of barrels They have investigated the resources of pretroleum until now everything is worked up. They have even gone so far as to go into the manufacture of lamp wicks for the purpose of bringing about the best results in illumination. One of the articles which they produce from petroleum is eocene, a coloring material which is used to make red writing fluid. Among other products, of course, are vaseline and mineral oil. The full knowledge of the resources, of petroleum developed by this large company, with its abundant resources has enabled it to reduce during its history the cost of illuminating oil from twenty-three to a little less than seven cents a gallon, for standard white oil at the seaboard. It has built up in the petroleum business alone an export demand of fifty millions a year, which is constantly increasing.

The same work may be done in any line. The company which is formed merely for the purpose of holding up prices is sure to fail of its object. Such a thing never succeeded during the history of the world. Any success of that kind must be temporary. The great success is where the purpose is to reduce the cost of production, improve quality, increase consumption, and generally push the business. Where a trust operates along this line it is perfectly legitimate and will succeed. Where it takes the position of a squeeze it will bring about an antagonistic public sentiment which is irresistible, and will very properly wipe it from the face of the earth.

VERMONT GRANITE.

The granite business is fast coming to the front among Vermont's industries, and promises to rival the marble products of Rutland. Recent investigations show a superior quality of the stone, accessibly situated in the woods of Hardwick and Woodbury, small towns thirty miles west of St. Johnsbury. No less than twelve companies have, within a short time, secured large parts of the land containing this stone, and are rapidly preparing for active operations. The building of a railroad is proposed from Hardwick station to the quarries, a distance of four miles. A careful examination reveals eight grades of granite, dark and light in color, and fine and coarse in grain. Dealers speak very highly of the stone's susceptibility to polish, and its reception in the market is assured. —*Manufacturers' Gazette.*

A singular deposit has been discovered near the base of a mountain near Taylorville, N. C. It resembles clay in pliability, but when exposed to the air becomes as hard as stone. Blocks of it have been dug out and used for all the purposes of stone, and it is proposed to build houses with it.

The man in the moon has one advantage over his terrestrial brothers—the fuller he gets the more brilliant he grows. —*Life.*

SOMETHING ABOUT EXPLOSIVES.

ALL quarries have a certain amount of covering which must be removed before the stone can be taken out. This deposit is either a part of the stone which has become disintegrated by the weather or is a later deposit. The first consideration in removing this deposit, or "stripping," and in forming a quarry face, is to get the broken stone out of the way as quickly and cheaply as possible regardless of its size. For this purpose no special skill is required in the management of the explosive, but for breaking rock which is to be used, much skill and knowledge are required in order to reach the best results. Furthermore, a knowledge of the particular stone which is being worked is necessary. Every quarry has its peculiarities and must be worked according to the best method for that peculiar stone.

The use of a sudden explosive, like dynamite, is to be avoided. The effect of such explosives is to shatter the stone in many directions, as does a blow from a hammer. Coarse gunpowder is better. Repeated light charges of powder covered with sand are much better than heavy charges tamped in tight. A rock may be detached without breaking by means of often repeated light charges, which would be badly broken were a single heavy charge employed strong enough to detach the rock. Where a heavy charge is employed the shape of the bottom of the drill hole influences the direction in which the rock will split to a greater extent than does the rift. When light charges are used, the bottom of the drill hole influences the direction of the breakage, but to a less extent. Much rock has been wasted through a lack of knowledge on this point. If one examines the bottom of a drill hole which has been made with a steel bitted percussion drill, it will never be found round, and a hole made with a hand drill is always triangular at the bottom. A charge will ordinarily break the rock in three directions corresponding with the shape of the bottom of the drill hole. In the sandstones quarries of Portland, Conn., they have controlled the blast very successfully by the use of the following device:

Deep holes from ten to twenty or more feet in depth are drilled with a diameter of ten to twenty inches. These holes are made by machinery, and the direction of the blast is determined by placing the charge of powder in canisters of tin, shaped according to the kind of blast required. These canisters are placed in the drill holes and tamped in with sand so that the effects of the blast are the same as though the holes were the shape of the cannister. Where a break across in a straight line is desired, the cannister is made of two pieces of sheet tin, the edges being left unsoldered and the ends covered with paper or cloth. A horizontal cross section would show the cannister bounded by two minor segments of a circle. The blast is in the direction of a plane passing through the edges of the cannister. Where the shape of the blast is not considered a great waste of rock necessarily follows

In most quarries where the shape of the rock is to be considered, powder is only used to detach large pieces which are further worked up by means of wedges. The drill hole is put down to the depth to which the rock is to be broken and light charges of powder are employed. Afterwards a heavy charge is employed which forces the block forward. As every rock has a different structure, the direction of cleavage planes influences the management of the blast. There must be at least one free end to allow the rock to move out to the face. Where the ends are cut off by natural joints they are called "end joints:" horizontal joints, called "bottom joints," are more common.

It sometimes happens that the bottom joints occur only at great intervals. The Penryn quarries, in California, are of this kind Here they cut an underblast along the first bottom joint from one end joint to another. A line of lewis holes is put down 15 or 20 feet from the face and the blast breaks out the block between the joints and down to the bottom joint which is about eighty feet from the top. Such blasts act more like wedges than ordinary blasts and are capable of breaking off blocks containing 100,000 cubic feet of stone.

For quarrying sandstone in the larger quarries powder is not often used. Granite is less liable to be injured by the use of explosives than softer stone, but even in quarries of this class of stone, blasting is not often used except for detaching large blocks which are removed by other means.—*Canadian Mining Review.*

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NEW EXPLOSIVE.

The latest addition to the list of high explosives is called carbo-dynamite. It is composed of ninety parts of nitro-glycerine absorbed by ten parts of a variety of carbon. A London paper gives an account of some experiments with it, which seem to show that it possesses several important advantages over ordinary dynamite; among others, considerably greater power, and the generation of much less noxious vapor when exploded in confined places. It is claimed also to be entirely unaffected by water.

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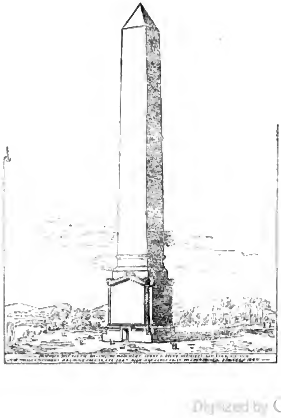
A new explosive called Emmensite is attracting much attention. At a recent experiment a large lump of the explosive was set on fire, and when it had begun to burn quite briskly was thrown into a barrel of water, but it continued to burn, the water becoming very greatly agitated. Another test consisted in suspending cartridges containing two ounces of Emmensite dipped in paraffine in the center of barrels filled with water. The barrels were blown to atoms. Lead tubes weighing 70 pounds each, 5 inches in thickness, 8 inches high, and with a bore 5 inches deep and one inch in diameter, were used for the next test. A cartridge of rackarock was placed in one, dynamite in another, and Emmensite in a third. In the case of the rackarock the tube expanded to 6½ inches, in the dynamite to 6¾, and the Emmensite 8½ inches.



OUR ILLUSTRATION.

We present this month the design of Herbert Pierson, architect, of New York city, for the Indiana State Soldiers' and Sailors' Monument, and in conformity with our practice we submit our criticism of the design. We have no apology to offer for our practice, which is different to the custom of most journals of this character, who submit all designs which come to them without criticism. With the designs which have come to us in the past we have been able to say much that is pleasant. In this design we can see little that is agreeable. In the first place the design is not in any sense suited to the locality, and again it has no distinct relation to the purpose for which it is intended. It might be judged as being a court house, a state building, or other structure of that kind, of a pretentious character. The outline is crude. Take for instance, the arches in the front story of the circular tower in the corner immediately facing the reader. The design is positively feeble. Then again, we would call attention to the corner columns under the porches; the arrangement is extremely weak. Above the ornamental part of the cap there is no relief whatever. An examination of the collonades of the second story, the arches and columns of the main tower and in fact every other prominent feature of this structure, bears out the most severe criticism.

Herewith we submit the description of the design as furnished by its author:

> The idea that the author has intended to convey in the accompanying drawing is a building that shall not only be a monument to the memory of the soldiers and sailors of the past; but also at the same time serve as a memorial in the future of those whom the state may wish to honor. That, as the years go by, it may be added to by the gifts of statues, busts, memorial tablets, windows, etc., to the memory, not only of those to whose honor it is built, but all those, whether in statesmanship, science, literature or art, who shall be considered by their acts worthy of remembrance.
>
> Following out the idea, the first requisite is ample space for the accommodation of such gifts in the way of tablets, statues, etc., as shall be offered. That this is fully met will be seen by reference to the sketches. Around the central dome are arranged circular galleries, one of which might be devoted to relics, and be a sort of museum; another might serve for tablets, busts, etc., that relatives, regiments, or societies might wish to contribute; the third to groups of statuary; as to the four circular rooms in the towers they may serve the same purpose. In addition to these features, the four porches, the loggias above them and the roof promenade afford so much room that space requirements seem fully met.
>
> Romanesque has been the style chosen, partly because it seemed by reason of its massive severity eminently fitted for a building of this sort and partly because this more than any other seems to approach a national style.
>
> The flooring is a combination of marble and mosaic. The main idea for the scheme of decoration, whether of statuary, bas reliefs, mosaics or paintings would naturally be scenes from the history of the state, its discovery, battles of the early settlers, of the Mexican war, and of the Rebellion—and the triumphs of peace; in short, all such events or persons as shall be deemed worthy of remembrance or example.

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A GRAVEYARD FIRE.

A destructive fire broke out on the afternoon of July 28 in the old cemetery at Cynthiana, Ky. A pile of brush caught fire and the dry grass took up the flames and spread it over about five acres in the edge of the city. The wooden tombstones in the cemetery were consumed, and the fences surrounding the place. If the fire company had not responded so promptly the whole end of the town would have been destroyed. As it is, only the grass in the cemetery and the tombstones are gone.

THE GROWTH AND DECAY OF ROCKS.

The belief that rocks and stones, especially the loose bowlders found in the drift, have grown and are growing in their present situation, is not uncommon among ignorant people. At certain points on the coast of Maine the fishermen are unanimous in their belief that the rocks in the harbors are growing, as they find less water over them than in former years. This is probably true in one sense as there can be but little doubt that the land in those localities is slowly rising.

The early settlers of New England, in plowhing up their land for the first time, and finding it filled with rounded rocks of every size, from the tiny pebble to the massive bowlder, and knowing nothing of the great ice age and the geological discoveries of more modern times, might well have thought that the stones had grown *in situ* by some concretionary process; but we now know that they are rather diminishing than increasing in size, and that they have all been transported from the parent ledge by the irresistible power of moving ice, in many cases for hundreds of miles.

Nevertheless, it is true many rocks actually do grow. The limestones have been formed by living organisms, like the coral polypes; and it may even be said of many limestone deposits, that every particle has at some time formed a part of a living animal. Sandstones, slates, and probably some varieties of granite, have all been deposited underneath large bodies of water, and in this sense have gradually grown to their present dimensions. Only the igneous or volcanic rocks cannot strictly be said to have "grown," and those of this class which are highly crystalline may be indirectly so considered, as the formation of a crystal, either from fusion or solution, presents in many ways a wonderful resemblance to the growth of a living organism.

It is, however, the decay of the rocks that is of the most importance, and with which we have most to do. The "eternal hills" are not only "shaken," but are very far from being eternal. They are constantly decreasing in size, and being washed down into the valleys. Even the lofty Alps are considered to be but the "stubs" or remains of a much loftier range existing in past geological epochs. It is to this constant degradation and decay that the farmer owes his fertile fields, as the soil from which he raises his crops was at one time in the condition of hard and barren rock.

The agencies which cause the decay of the rocks are very numerous and varied. Cold, heat, frost, rain, wind, vegetation, running streams, and standing water do all their part; and chemical decomposition is an important factor, especially with granites and other rocks containing felspar. Extremes of heat and cold cause the surface of the rock to crack, and the cracks become filled with water, which freezes and expands, breaking it up still further. Every stream of water, from the trickling raindrops to the rushing torrent, does its part in wearing away and pulverizing the rocks in its course; and the finely divided material is carried along by them, and deposited along its banks, or in the sea at its mouth. In dry countries the sands of the deserts, blown about by the winds, wear away the rocks, just as, on a smaller scale, the sand blast cuts the hard glass, and engraves beautiful designs on its surface.

In that wonderful natural laboratory which exists in every growing plant there are reagents which can slowly but surely act upon the hard, stony particles in the soil, and cause their decomposition. The wheat-stalk, for instance, possesses the power o assimilating from the soil that most refractory element, silica, which the chemist can only dissolve by the aid of his most powerful reagents, and building it into its structure to give it the requisite strength. In a similar way, lime, magnesia, phosphoric acid, and potash are all derived from the soil, causing the further disintegration of the more or less fine grains of sand or rock previously existing there.

The decomposition, or "weathering," of granite and other felspathic minerals is a matter of much interest. Granite is a composite rock formed of the minerals quartz, mica, and feldspar. Quartz is one of the hardest and most permanent of minerals; but mica, and more especially felspar, contains alkalies which are easily removed. Chemically speaking, felspar is a silicate of alumina and potash of soda. The chemical combination is so weak, that, under the action of the elements, the potash of soda is rendered soluble and washed away, while the silicate of alumina remains as a fine white powder, known as kaolin or porcelain clay. The large deposits of this valuable substance in various parts of the world are supposed to have been formed in this way by the decomposition or weathering of felspar or felspathic rocks.

We thus see that even in the mineral kingdom there is a constant change. The solid rocks are ground down into gravel, sand, or clay of various degrees of fineness. The streams transport them to the lower levels, or spread them out over the ocean's bed. We know that in the past these deposits have been hardened and consolidated into conglomerates, sandstones, schists, shales, slates, and metamorphic rocks, and raised up by the contracting earth into hills and mountains once more. Whether the process is ever to be repeated, we do not know; but as long as the present natural forces are in operation, we know that the mountains, hills, rocks and stones are continually decaying, and the surface of the earth tending to one general level.—*Science News.*

◆

Five persons were imprisoned by the caving in of a wall at a quarry at Chancelade, near Perigeux, France, recently, and there were no means at hand to rescue them. To find out where they were, a shaft twelve inches in diameter was bored, down which was slid a tube, near the end of which was a small camera surrounded by a battery of electric lights. With this apparatus a number of negatives were taken and the effect of the disaster shown, even to the faces of two corpses. It was thus known that the men were dead, and that effort to succor them would be useless.

THE CEMENT-TESTER AT THE POUGHKEEPSIE BRIDGE.

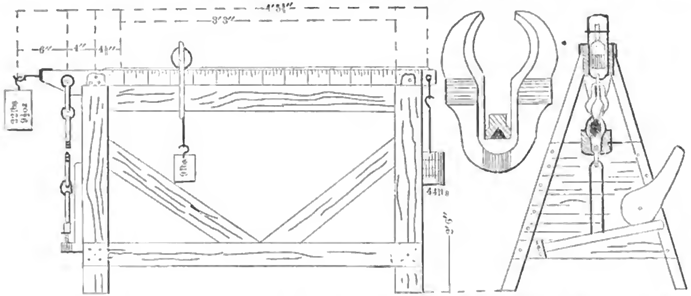
THERE have already been used in the Poughkeepsie bridge substructure over 60,000 barrels of cement, of which 40,000 were required for the crib and caisson works and 20,000 for mortar and concrete filling of the masonry.

At least one barrel in every ten was tested, and, as many samples were prepared for treatment under different conditions and breaking at different ages, the work of testing was very considerable, and an easy, rapid, and efficient method was quite important.

Mr. J. F. O'Rourke, engineer in charge for the Union Bridge Company, devised the machine here illustrated, which was built by ordinary mechanics at a total cost of less than $100 and works easily, rapidly, and very satisfactorily, and has tested all the cement used in the work.

Briquettes are prepared having a minimum sectional area of exactly one square inch; they are inserted in the jaws of the machine and contact secured and the scale-beam leveled by a slight movement of the eccentric shown in the end view.

The index weight is then rolled out until the sample breaks. If the sample resists the maximum strain due to the index weight it is rolled back to zero and a weight hung on the end of the beam sufficient to give a strain of 100 pounds on the sample. The operation is repeated until the specimen breaks, when the beam falls and the index saddle descending is engaged by its shoulders on the top bars of the frame, and with the addition of the weights at the end, registers the breaking load.



The capacity of the machine is nominally 1,000 pounds, but it might readily be used to a much higher limit. It is very sensitive and has an initial error of less than five pounds. It occupies little space in operation, is very light, and designed to be readily taken apart and compactly stowed for transportation.

◆

The New York Black Granite Company, South Addison, Me., employs a rather large force. Its granite is used chiefly for ornamental work, and is cut, polished and finished at the quarries.

Work on the Dodlin granite quarry in Skowhegan, Me., is driving; at the present time there are employed about fifty men, and more wanted.

THE CONVENTIONS.

THE NATIONAL ASSOCIATION.

[OFFICIAL MINUTES.]

REPORT of National Marble and Granite Dealers' Association of the United States of America, held at Cleveland, July 11 and 12, 1888.

Meeting called to order at 2 P. M., July 11. In the absence of President A. A. McKain, of Indianapolis, Vice-President James Harsha, occupied the chair. The treasurer, J. F. Needler, of Indianapolis, as well as the regular elected delegates from Indiana were absent.

There were present from Ohio, James Harsha, Circleville; F. W. Underhill, Elyria: A. J. Robertson, Sidney; J. A. Flatz, Piqua, and H. D. Pierce, Toledo.

New York was represented by James Sharkey, Samuel Cocroft and James Sutter Jr., all from Brooklyn.

Ontario by J. G. Gibson, Toronto, R. J. Sanderson and E. M. Furniss, Hamilton.

Massachusetts by J. Q. A. Field, of Quincy.

The report of the secretary was read, and same approved. The treasurer's report was rendered by the secretary, showing a balance on hand of $19.20

On motion of Mr. Underhill, it was voted to pay the secretary $10 for his labors during the past year.

Mr. Field, of Massachusetts, moved that a committee of five regular delegates be appointed by the chair, for the purpose of conferring together, and reporting such changes as seemed advisable to make in the Constitution and By-Laws, and that the representatives present from New York and Ontario be requested to meet with them as an advisory committee. This motion was adopted. The president appointed J. Q. A Field, of Massachusetts, F. W. Underhill, J. A. Flatz, I. H. Kelley and James Harsha all of Ohio. Adjourned until 8 P. M.

Adjourned meeting called to order at 8 P. M.

The special committee reported through its chairman, J. Q. A. Field, the following:

That section I of the constitution be amended by adding "and Canada" after the words "United States of America."

Adopted.

A long discussion followed the reading of changes suggested in some of the following sections, and coming to no understanding the meeting adjourned until 8 P. M. July 12.

ADJOURNED MEETING.

July 12, 8 A. M.

Called to order by James Harsha. Vice-president. On motion of James Sharkey, of New York, the following was adopted:

"That a committee consisting of the president, acting vice-president and secretary of the National Association, and two from each association, local or state, now organized, or which may be organized, be selected by the acting vice-president of the National Association, for the purpose of revising and changing our constitution and by-laws. Said committee to meet at Buffalo, N. Y., on the last Tuesday in August, and shall have the power to call a meeting of the National Association, if in their judgment it shall be deemed best, at the same time and place. If not deemed advisable so to do, then the action of said committee in all matters under this call shall be final.

The president appointed the following committee:

New York—James Sharkey, Samuel Cocroft.

Massachusetts—J. Q. A. Field, W. H. Mitchell.

Indiana—W. E. O'Haver, W. C. Whitehead.

Ohio—H. M. Woodard, A. J. Robertson.

President A. A. McKain, acting vice-president James Harsha and secretary H. D. Pierce, belong to above committee.

The following resolution introduced by H. D. Pierce was read and adopted:

WHEREAS, There is published in Indianapolis, Ind a journal called STONE and dedicated to the interests of those engaged in the producing, working and using of stone, marble and granite, etc., and,

WHEREAS, Said journal is of high literary merit, and contains information valuable to all dealers, therefore, be it

Resolved, That we, the Marble and Granite Dealers' Association of the United States of America, give our hearty indorsement to this journal, and recommend it to all associations and dealers throughout the United States.

Adjourned to meet on the second Tuesday in July, 1889, at Buffalo N. Y. Subject to call of the special committee.

H. D. PIERCE, Secretary.

THE OHIO ASSOCIATION.

[OFFICIAL MINUTES.]

CLEVELAND, O., July 11, 1888.

Marble and Granite Dealers' Association of Ohio, in pursuance of aken at Columbus, Dec. 28, 1887, met in convention at American se, Cleveland, O., at 3 P. M., July 11, 1888. President James Harsha called the association to order. The minutes of the last meeting were read by the secretary, Homer M. Woodard, of Columbus, and approved by the association. The following gentlemen were recognized as proxies: Edward MacLain, representing the Cincinnati-Georgia Marble Company and the American Marble Company, of Marietta, Ga.; and Hugh M. Jones, representing Jones Bros., of Boston. The following applications for membership were read by the secretary and the gentlemen elected: Joseph Carabelli, Cleveland; Goodsell & Sweet, Garrettsville; T. C. Myers Cleveland; Jacob Hornig, Vermillion; Wolf & Co., Mechanicsburg; J D. Halter, Lima; Martin & Clevell, Dayton; J. L. Halter, Napoleon Thos. M. Stanlland, Dayton; Ewen, O'Neil & Co., Westerly, R. I.; Toledo Marble Co., Toledo, O.

THE REPORT OF THE SECRETARY

showed that the receipts since last December had been $113 and the disbursements $100.16, leaving a balance of $12.84. The whole number of members enrolled had been seventy. Two had withdrawn. A committee consisting of Harry Dewar, Cincinnati; H. M. Jones, Boston; and J. L. Bauhof, Canton, was appointed to audit the account of the treasurer.

The secretary read the following report of the special committee appointed under the rules to investigate charges against Hanlon & Lemon Hillsboro, O., which was adopted.

COMMITTEE'S REPORT.

HILLSBORO, O., March 21, 1888.

To the Marble and Granite Dealers' Association of Ohio:

Your committee appointed to inquire into certain charges preferred by Bro Chas. M. Harsha, against Messrs. Hanlon & Lemon (a copy of which is hereunto attached), have attended to that duty, and beg leave to submit the following report:

The president, James Harsha, being a relative, notified I. H. Kelley, vice president, of Third District of Ohio, of this complaint, and inclosed the complaint and evidence thereof, directing him to notify two members, and with himself proceed to Hillsboro, and to hear and determine the facts in the case. Accordingly Bros D. M. Bunnell, of Urbana, and I. H. DeBow, of Granville, were notified to meet the vice-president, I. H. Kelley, at the Parker House, in Hillsboro, March 21, 1888, at 10 o'clock A. M., and the two parties, Bro. C. M. Harsha and Messrs Hanlon & Lemon were duly notified to appear at the appointed time, and give any and all evidence bearing upon the case. Your committee met according to appointment, and the vice president made a personal call on Messrs. Hanlon & Lemon, inviting them to appear and make any statement they might desire. Messrs. Hanlon & Lemon declined to take any part in the matter, and absolutely refused to appear, stating that the committee or association could do whatever they pleased in the matter.

From all the evidence and information to be gained, your committee has decided that the charges as set forth are fully sustained, and would recommend that the penalty be imposed by Article 13 of the Constitution, viz.: That the wholesale dealers, members of our association, be duly notified not to sell any stock of any kind to the defendants, Hanlon & Lemon, the same to be in force and effect in accordance with Article 14 of our Constitution.

Respectfully submitted,

I. H. KELLEY,
Vice Pres't 3d Dist. M and G D. Ass'n of Ohio.
D. M. BUNNELL
ISAAC H. DEBOW.

The committee appointed to investigate charges preferred against the Blue Ridge Marble Company, of Cincinnati, also made a report. This committee consisted of L. A. Moore, I. H. Kelley, and Jacob Schwartz. The report stated that the charges were not sustained. Mr. Dewar, representing the company, asked that the name of the complainant be made public. It was also asked that the nature of the charges be explained. On motion the report was referred back to the committee with instructions to make it more complete and to present it again at to-morrow morning's session.

An invitation from the Cleveland Stone Company to visit the Berea quarries was read. The company offered to transport the members in a special train and return them within four hours. Owing to press of business it was decided to decline the invitation with thanks.

A request from Price & Co., of Circleville, asking that they be permitted to withdraw from the association was granted.

A letter from Charles Wege, of Columbus, regretting his inability to be present was read and placed an file.

H. D. Pierce offered the following resolution, which was unanimously adopted, indorsing STONE as a worthy journal devoted to the interests of the trade.

WHEREAS, There is published in Indianapolis, Ind., a journal called STONE, and dedicated to the interests of those engaged in the producing, working an using of stone, marble, granite, etc., and,

WHEREAS, Said journal is of high literary merit and contains information valuable to all dealers, therefore, be it

Resolved, That we, the Marble and Granite Dealers' Association of the state of Ohio, give our hearty indorsement to this journal, and recommend it to all associations and dealers thoughout the United States.

Mr. D. H. Ranck, publisher of the journal, was present, and expressed his thanks for the indorsement in a few appropriate words. The meeting adjourned until 9 A. M. Thursday.

ADJOURNED MEETING.

9 A. M. July 12, 1888.

Meeting called to order by President James Harsha. The special committee appointed to audit the books of the treasurer reported through H.

Dewar that the same had been found correct. Report adopted and committee discharged

On motion of H. D. Pierce the original report of committee to investigate charges preferred against the Blue Ridge Marble Co. was adopted.

On motion of H. D. Pierce, the president appointed Messrs. Robertson, Schwartz, Underhill, Sargeant and C. M. Harsha a committee to present to the association for their action, the names of officers to be elected for the ensuing year. Adjourned until 1 P. M.

Association assembled at 1 P. M. with President James Harsha in the chair.

Report of committee on officers was rendered as follows through its chairman A. J. Robertson, of Sidney.

Your committee appointed to present names of officers to be elected for the ensuing year, beg leave to report as follows:

For President—James Harsha, Circleville, O.

For Vice-Presidents—
1st District—A. J Robertson, Sidney.
2d District—Joseph Carabelli, Cleveland.
3d District—C. M. Harsha, Hillsboro.
4th District—Roche Burrell, New Lexington.
Secretary and Treasurer—Homer M. Woodard, Columbus.

Directors—
H D. Pierce, Toledo.
John Sargeant, Clyde.
Chas. Sheldon, Rutland, Vt.
I. H. Kelley, Springfield
Harry Dewar, Cincinnati.
Chas L Strong, Cleveland.
E. Smith, Norwalk.
J A. Reuhof, Canton.
L. A. Moore, Zanesville.

On motion the report was accepted, and by suspension of the rules, the officers were elected as named in the report.

The president and secretary were called on for speeches and responded briefly, thanking the association for the confidence reposed in them, and pledging themselves to work earnestly for the good of the association.

The president appointed C. H. Sheldon, of West Rutland, Vt., to invite any dealers present in the city not members to attend the meeting.

The directors' report was then rendered and approved.

DIRECTORS' REPORT.

Owing to press of business your directors have been unable to formulate a concise and elaborate report. What we have to say now is simply in the line of suggestions, and rather disconnected.

We would suggest that a committee be appointed for the purpose of securing legislation and enactment of laws giving marble and granite dealers authority to remove from cemeteries work put up and not paid for.

In order to further the interests of our association we feel it would aid and benefit us to divide the state into districts—and that said districts hold such meetings as seem best to their interests. This plan, we believe, would increase our membership and create greater interest. [Signed], H. D. PIERCE, Presd't Board Directors.

The following districts were suggested.

First District—A. J. Robertson, Vice-President. Counties. Allen, Auglaize, Defiance, Delaware, Fulton, Hancock, Henry, Logan, Lucas Marion, Mercer, Morrow, Ottawa, Paulding, Putnam, Sandusky, Seneca, Shelby, Union, Van Wert, Williams, Wood and Wyandott.

Second District—Joseph Carabelli, Vice-President Counties Ashtabula, Carroll, Columbiana, Coshocton, Erie, Geauga, Lake, Harrison, Holmes, Huron, Knox, Jefferson, Lorain, Mahoning, Medina, Portage, Richland, Stark, Summit, Trumbull, Tuscarawa and Wayne

Third District—C. M Harsha, Vice-President. Counties Adams, Brown, Butler, Champaign, Clerk, Clermont, Clinton, Darke, Fayette, Green, Hamilton, Madison, Miami, Montgomery, Preble, and Warren

Fourth District—Roche Burrell, Vice-President. Counties Athens, Belmont, Fairfield, Gallia, Guernsey, Hocking, Jackson, Lawrence, Licking, Meigs, Monroe, Morgan, Muskingum, Noble, Perry, Pickaway, Pike, Ross, Scioto, Vinton and Washington.

The Chair, on motion of A. J. Robertson, appointed the following committee to secure the legislation recommended in the directors' report: H. M. Woodard, Columbus, T. M. Staniland, Dayton and H. Dewar, Cincinnati.

By request of the association, President James Harsha was added to above committee.

Mr. Robertson urged upon the members the necessity of securing the cooperation of representatives of the various towns and districts in this important work.

The secretary was instructed to secure for use and reference a copy of the law just passed in the state of New York relating to this same subject.

The directors were authorized, by vote of the association, to divide the state into smaller districts if advisable for the purpose of calling frequent district meetings, and that the result of such work be presented at the next regular meeting.

Interesting and instructive remarks were made by D. H. Ranck, of Indiana, pertaining to the results obtained by the Millers' Association of Indiana through holding frequent district meetings and employing an "organizer" to canvass the state.

The directors, after deliberating on the matter of forming smaller state districts, reported as follows which report was adopted:

"We believe the best interests of this association can be served by allowing the district to remain as now fixed, but recommend that the vice-president and directors of the four districts be instructed to call one or two meetings in the various districts they represent, and report their progress at the next meeting of this association.

The secretary was instructed by vote of the association to notify the vice-presidents of the exact boundary lines of each district.

The following resolution offered by Mr. Graham, of the Lyman Strong Co., and seconded by C H. Sheldon, of Vermont was adopted.

Resolved, That the Ohio Marble and Granite Dealers' Association do indorse and recommend the "Time Book" published by F A. Cardoni, of Detroit, Mich., as being of great benefit to the trade.

Mr. Sheldon in seconding this resolution called attention to the fact, that there was great lack of knowledge on the part of marble and granite cutters and dealers as to the time required to cut certain designs; that this time book, if properly used, would be an invaluable aid to dealers both wholesale and retail.

On vote of the association the following amendments were made to the Constitution.

Article IV, of Constitution, amended by striking out the following—"*in Ohio.*"

Article XV amended, to read:

"The meetings of the association shall be held annually, at such places as may be determined by vote of the members, and extra or special meetings may be convened on a call signed by the president, secretary and one vice-president."

Article 15, Constitution amended to read as follows:

"Any member of this association found guilty of violating any of the rules specified in the By-Laws of this association, shall be fined not to exceed three hundred dollars, nor less than twenty dollars, and for repeated violation of the rules may be expelled.

"If the board is called upon to investigate and try a dealer who is not a member of this association, and find that he is doing business contrary to the rules of good business principles and fair dealing, the fine and penalty shall be, that the members of this association after being duly notified, shall not sell, or furnish in any way, any kind of marble or granite to the accused, to be used by him in his business. If said dealer makes application to the president for a hearing and relief, and remits a fee of $10 to be applied toward expenses of the association, the president shall convene the proper committee in accordance with Article XIV, and if the accused pay such fines or penalties as the board are warranted to assess, and render satisfaction to the association, the board shall cause the secretary to notify all members of their decision and findings."

An amendment to Section XII of the By-Laws was offered, and by vote of the association the same was laid on the table.

The following new sections to By-Laws were then added by unanimous vote.

Section XV—"No member of this association will be permitted to make an indefinite contract, or agree to furnish to any dealer an indefinite amount of material of any kind, marble or granite, unless it shall be provided in said contract, that in case either party to said contract be convicted by this association for any violation of any of its rules, then said contract shall be null and void."

Section XVI—"Should a member sell his marble and granite business, he may be considered an honorary member of this association, and no dues be required of him. Should he reingage in the business, he shall be considered a member by paying dues, only."

It was moved and carried that an order be drawn on the treasurer for $5 in favor of James Harsha, for cash advanced by him to pay the membership fee of E. H. Davis, of Rutland, Vermont, the claim never having been paid by Davis.

Communication from J. Sargeant, Clyde, O., relative to violation of rules, by Sanford & Hughes, of Clyde, O., was read and referred to proper committee for further action.

By request of H. Dewar, the report of the committee investigating charges preferred against Sanford & Hughes, one year ago was read, which brought out the fact that Sanford & Hughes were then notified that further violations of the Constitution and By-Laws would result in inflicting the penalty laid down therein.

On motion the association reconsidered the adoption of the special committee's report on charges preferred against the Blue Ridge Marble Co., of Cincinnati, O.

The committee then made the following detailed report which was adopted:

Your committee appointed to investigate certain charges and specifications against the Blue Ridge Marble Co., represented by Bro. Harry Dewar, would report as follows:

Said Blue Ridge Marble Co, was charged with having furnished to Hanlon & Lemon of

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Hillsboro, O., stock and material after having due notice that they had been convicted of certain charges preferred against them by the association.

To these charges said Blue Ridge Marble Co., makes the following replies as appears in the subjoined statement:

"Did you sell to Hanlon & Lemon?"

Mr. Dewar states that they furnished stock to Hanlon & Lemon, since the notice not to sell to them under a contract made before Hanlon & Lemon were disqualified.

"Were you cognizant of charges being preferred against Hanlon & Lemon before you sold the them stock?"

Mr. Dewar—I was.

Dewar states that his contract was to furnish them stock for one year from its date, which was prior to their conviction, "made no new contract with them after that time. Shipments were made as needed, an obligation on their side to buy all they needed of us, I had no purpose in view toward circumventing the rules of the association."

"Is it customary to make contracts in this way?"

Mr. Dewar—It is in my business.

The accompanying letter is all the evidence your committee have against said Blue Ridge Marble Co., and brothers, James and C. M. Hersha declining to offer any testimony your committee is without further evidence in this case, and therefore report:

To the officers and members of the Marble and Granite Dealers' Association of Ohio.

Your committee appointed to inquire into certain charges and specifications preferred against the Blue Ridge Marble Co., have made due investigation of the same and find that said Blue Ridge Marble Co., made a contract with Messrs. Hanlon & Lemon prior to their receiving notification of the conviction of Hanlon & Lemon, and prior to being notified not to sell Hanlon & Lemon any material. We further find that all stock sold to Hanlon & Lemon by said Blue Ridge Marble Co., is under and by virtue of this contract so made. We recommend the dismissal of the investigation and discharge of the committee.

I. H. Kelley
L. A. Moore } Committee.
J. Schwartz

The bills of the aforesaid investigating committee were rendered, amounting to $44.50, and ordered paid.

It was moved and carried that the secretary be paid for any extra expense he may incur in performing the duties of his office.

A visiting delegation from the Ontario, (Canada), Marble and Granite Dealers' Association, was present, consisting of their president, Mr. J. G Gibson, of Toronto; Mr. E. M. Furniss, their treasurer, from Hamilton; J. W. Hutchinson, secretary, Aymler, and Mr. R. J. Sanderson, Orvilla, of their board of directors. They were introduced to the brethren by the secretary, and expressed themselves as being well pleased with the proceedings. They report the Ontari oassociation in a healthy and prosperous condition.

The D. H. Ranck Publishing Co., of Indianapolis, very generously offered to print in their journal Stone a full and complete report of our proceedings, also our Constitution and By-Laws in book form for distribution, without charge.

This proposition was unanimously accepted, and the thanks of the association extended to the company.

After interesting remarks by the president, secretary and other members it was moved and carried that the next meeting be held in Dayton, O., on the second Wednesday in February (12), 1889.

Association then adjourned *sine die.*

Homer M. Woodard, Secretary.

CONSTITUTION AND BY-LAWS OF THE MARBLE AND GRANITE DEALERS' ASSOCIATION OF OHIO, ADOPTED OCT. 5, 1886; REVISED JULY 5, 1887; REVISED JULY 12, 1888.

To the Marble and Granite Dealers of Ohio:

THE Constitution and By-Laws of our State Association are herein set forth, and we trust their principles may meet the hearty approval of every manufacturer and dealer. That what we have done may still be improved on there is no doubt. As we grow in numbers and counsel together we may see wherein we can revise our rules and regulations to further advantage. What we have done we have aimed to do in accordance with the principles of justice and right, and for the general good of both branches of the trade. Our association is not formed for the benefit of a few, but for the mutual benefit and protection of every member; all have equal rights and equal privileges; the only requirement made is that you shall do an honorable, upright business. We hope the time is not far distant when similar organizations will be formed in every state of our Union. Almost every branch of trade has an association, and have joined together for mutual benefit and protection. Ours is one of the last to wheel into line, and yet there is no trade which stands in need of, or will be more benfited by an association than ours may be.

To all retail dealers in Ohio we would say, weigh these matters well, and see if you do not think it will pay you better to join us and give us your aid and influence, help us, and thereby help yourselves. Come up and let us counsel with and advise each other. Let us try and weed out the irregular practices that have been working us so much harm.

We hope every wholesale dealer who is doing a legitimate business in our state may help us; we intend to stand by our friends; help those who help us. By coming to our aid, and by refusing to sell to irregular, no-place dealers, you can do much toward a reform that will save many thousands of dollars for yourselves. You will sell just as many goods, and to better men. Take hold of this matter along with us, and you will see all branches of our business greatly improved, and in a much more healthy condition. Our trade will have a financial and commercial standing it does not now occupy.

To all those who contemplate purchasing cemetery work of any kind, we would say to you, should you receive a copy of this book, our Constitution and By-Laws, we would kindly ask you to please read and examine the same carefully. We are not a ring, or pool, as some very unprincipled men who pretend to be dealers may represent to you that we are, consolidated together for the purpose of extorting unreasonable prices for our work, for such is not the case. Quite the contrary, we mean *protection* to both our customers and ourselves against *fraud* and unfair dealing; we mean good, square, honest work at fair prices. Unfair and unscrupulous methods of doing business will not be tolerated by our association. Along with our rules and regulations we hand you a list of our members, who are, every man, honorably bound and pledged to deal fairly by you.

To our members we would say, be hopeful and encouraged. The dawn of better days is near at hand; do not lose faith if all cannot be accomplished at once; we shall win if we but persevere, because we have built upon a foundation of sound principles; we have already done good, and we can do more.

Our next annual meeting will be held in Dayton, O., Feb. 12, 1889. At all times we stand ready to give information, advice or assistance, and to aid any of our members who may call upon us to the the full extent of our power.

James Harsha, President.

Homer M. Woodard, Secretary.

CONSTITUTION.

[Revised July 12, 1888.]

Article I.

This association shall be known as the Marble and Granite Dealers' Association of Ohio.

Article II.

The object of this association shall be the general improvement and elevation of the trade in all its departments; the promotion of friendly relations and intercourse, and the protection of purchasers from imposition practiced by illegitimate and irresponsible dealers.

Article III.

Any person or firm who has a regular shop or building for the purpose of manufacturing or dealing in marble or granite for cemetery purposes, by retail; or wholesaler doing business in Ohio, can become a member of this association.

Article IV.

Any person or firm who *both* wholesales and retails marble and granite, or either, cannot become a member of this association.

Article V.

The officers of this association shall consist of a president, four vice-presidents, one for each of the four districts into which the state shall be divided; a secretary, who shall also perform the duties of treasurer, and a board of directors, to consist of nine members.

Article VI.

The officers shall be elected annually by ballot, and shall serve until their successors have been duly elected and qualified.

Article VII.

The president shall preside at all regular and called meetings of the association when present; he shall have power to convene the board of directors at any time and place, on business pertaining to the association.

Article VIII.

The vice-presidents shall assist the president in performing the duties of his office when called upon; they shall preside at all meetings of directors called to meet in their respective districts, with all the powers and privileges conferred on directors.

Article IX.

The secretary shall keep a correct record of the proceedings of all regular or called meetings of this association; notify members of the time and place of said meetings, and perform such other duties as his office requires.

Article X.

The duties of treasurer shall be performed by the secretary. He shall properly account for all membership fees, dues, fines, and all other moneys belonging to the association, and pay out the same only on the written order of the president. He shall give a bond satisfactory to the board of directors, and at each regular meeting shall render a faithful account of all receipts and expenditures.

Article XI.

Five members of the board of directors shall be selected from the retail trade and four from the wholesale trade. They must select one of their number as their president, and one as their secretary; and they shall perform the duties herein prescribed, and such other duties as the association may direct.

Article XII.

The board of directors shall fill vacancies in the board caused by death or otherwise, and shall investigate all charges and complaints.

Article XIII.

The meetings of this association shall be held annually, at such places as may be determined by vote of the members, and extra or special meetings may be convened on a call signed by the president, secretary and one vice-president.

Article XIV.

All complaints shall be made in writing to the president of the association, and accompanied by written evidence. If, in the opinion of the president, the investigation seems warranted by the evidence, he shall notify the proper vice-president and two members, who shall meet at such time and place as may be determined upon by the vice-president, to investigate and try the accused. These investigations shall be conducted on strictly business principles, with fairness and impartiality. No vice-president, nor member; shall be permitted to investigate and try a case if he is in any way either related to or interested in the plaintiff or defendant. They shall render their decision, together with the penalty they may have determined upon, if any, to the secretary, who shall at once notify the members of the result.

Article XV.

Any member of this association found guilty of violating any of the rules specified in the By-Laws of this association shall be fined not to exceed three hundred dollars ($300), nor less than twenty dollars ($20); and for repeated violation of the rules, may be expelled.

If the board is called upon to investigate and try a dealer who is not a member of this association, and finds that he is doing business contrary to the rules of good business principles and fair dealing, the fine and penalty shall be that the members of this association, after being duly notified, shall not sell or furnish in any way any kind of marble or granite to the accused, to be used by him in his business. If said dealer make application to the president for a hearing and relief, and remit a fee of ten dollars ($10), to be applied toward expenses of the association, the president shall convene the proper committee in accordance with Article XIV, and if the accused pay such fines or penalties as the board is warranted to asses, and render satisfaction to the association, the board shall cause the secretary to notify all members of their decision and findings.

Article XVI.

Any member shall have the right of appeal from the decision of the investigating board of directors to the association at its next meeting, provided notice of such appeal shall be given to the secretary, in writing, within thirty days after the decision; a majority vote shall repeal or sustain such decision.

Article XVII.

The fee for membership of retail dealers shall be three dollars ($3), and the annual dues four dollars ($4), and the fee for membership of wholesale dealers shall be fifteen dollars ($15), and the annual dues ten dollars ($10). The fee for membership must accompany the application, and the dues shall be payable semi-annually, in advance, on the first days of January and July. All members in arrears for dues for one year, after due notice of such arrears, shall be dropped from membership, and shall only be reinstated by making application to the secretary and the payment of one year's dues.

BY-LAWS.

[Revised July 12, 1888.]

Section 1. No member of this association shall pay any rebate to any purchaser of cemetery work, nor shall he allow more than the wholesale price for any marble, limestone, or any material in the rough, in payment for cemetery work.

Sec. 2 No member shall use any substitute for the material he sells, nor represent any material for what it is not; nor shall he sell marble for granite. He shall in every case perform his contract with his customers.

Sec. 3. Every member of this association shall have a substantial foundation under all work that he erects, whenever a foundation is necessary.

Sec. 4. All members or firms shall be responsible for the acts of their agents, or other employes, in matters pertaining to their legitimate business, and shall hold themselves accountable therefor.

Sec. 5. Any wholesale or retail dealer, member of this association, who may be found guilty of selling marble or granite to any retail dealer who is not eligible to become a member of this association, shall be expelled, and only be reinstated by paying such fine as the board may assess against him. Any retail dealer who may be found guilty of buying any material from a wholesale dealer who is not eligible to become a member of this association, shall be fined as the board may direct.

Sec. 6. Any member or firm refusing to pay his or their just debts to any other member or firm of this association, shall be expelled, if proven guilty, from this association.

Sec. 7. No member of this association shall use any unfair means to secure trade, either by misrepresenting the material used or the quality of work, or by attacks on the character or dealings of any other member of this association; and all contracts shall, in every case, be fully and faithfull ormed.

Sec. 8. Selling cemetery work for less than it is worth, cutting of prices, asking first one price and then offering for a less price, using unfair means to secure sales, slandering competitors, picking out objections to a competitor's work, shall not be practiced by members of this association.

Sec. 9. A violation of any of the foregoing sections where penalties are not specified, the board of directors shall fine not to exceed three hundred dollars ($300), nor less than twenty dollars ($20), and may expel the accused member or members.

Sec. 10. The action and decision of the members of the board of directors selected in accordance with Article 14 of the Constitution of this association shall have the same effect as if the whole board were present.

Sec. 11. An expelled member may be reinstated by the concurrence of a majority vote of the association.

Sec. 12. All members shall give the preference in business dealings to members or firms belonging to this association.

Sec. 13 This association pledges its support to individual members or firms who (after careful examination by the investigating committee) are found to be unjustly affected by any combination, or in any other way prevented from the proper conduct of their business.

Sec. 14. All applicants for membership must have the recommendation of one dealer, member of this association, and make application to the secretary in the following form:

APPLICATION FOR MEMBERSHIP.

..................Ohio,..........188

To the Officers and Members of the Marble and Granite Dealers' Association of Ohio:

The undersigned, ..., marble and granite dealer.. of this place, ...desirous of becoming member of your association. ....have read your Constitution and By-Laws, and do hereby pledge that ...will comply with their requirements as far as it is in....power so to do. .... also give you....pledge that....will, in buying or selling material used in our business, give members of this association the preference whenever it does not conflict with the strict rules of trade. Inclosed you will find $...., the amount of membership fee; and the secretary of the association is hereby authorized and instructed to place....name upon the roll of membership, should....be found to be eligible....applicant .

[Signature]............................

Recommended by... ....

Sec. 15. No member of this association will be permitted to make an indefinite contract, or agree to furnish to any dealer an indefinite amount of material of any kind, marble or granite, unless it shall be provided in said contract that in case either party to said contract be convicted by this association for any violation of its rules, then said contract shall be null and void.

Sec 16. Should a member sell his marble and granite business, he may be considered an honorary member of this association, and no dues be required of him. Should he re-engage in the business, he shall be considered a member by paying dues only.

Sec. 17. Cushing's Manual shall govern the parliamentary practice in all meetings of this association and board of directors, when it does not conflict with any rule of the association.

Sec. 18. It is provided that any proposed change in the Constitution or By-Laws can be made at any regular or called meeting of this association by an affirmative vote of two-thirds of the members present.

ORDER OF BUSINESS.

1. Calling of the roll of officers and members.
2. Reading of the minutes.
3. Consideration of applications for membership.
4. Report of directors.
5. Report of secretary and treasurer.
6. Reports of committees.
7. Unfinished business.
8. New business.

OFFICERS.

President—JAMES HARSHA, Circleville, O.

Vice-Presidents—

First District—A. J. ROBERTSON, Sidney, O.
Second District—JOSEPH CARABELLI, Cleveland, O.
Third District—C. M. HARSHA, Hillsboro, O.
Fourth District—ROCHE BURRELL, New Lexington, O.

Secretary and Treasurer—HOMER M WOODARD, Columbus, O.

Board of Directors:

C H Sheldon, Rutland, Vt.
H. D. Pierce, Toledo, O.
John Sargeant, Clyde, O.
Chas. L. Strong, Cleveland, O.
E. Smith, Norwalk, O
I H. Kelley, Springfield, O.
Harry Dewar, Cincinnati, O.
J. A. Deuhoff, Canton, O.
L. A Moore, Zanesville, O.

MEMBERS.

Wholesale Dealers

American Marble Co., Marietta, Ga
Blue Ridge Marble Co., Cincinnati, O.
Booth Bros., (Granite, Niantic), Conn.
Bowers, R. C. & Co., (Granite), Montpelier, Vt.
Carnes & Kane, (Granite), Barre, Vt.
Cincinnati-Georgia Marble Co., Cincinnati, O.
Clements, Charles (Marble and Granite and Importer of Statuary), Boston, Mass.
Dougherty & List (Marble), New York City.
Dunham & Gordon (Granite), Barre, Vt.
Evans, W H (Marble), Baltimore, Md.
Ewen O'Neil & Co , (Granite), Westerly, R I.
Falconer & Marnock (Granite), South Quincy, Mass.

Jones Bros., (Granite and Statuary), Boston, Mass.
The Lyman Strong Co. (Marble), Cleveland, O.
Milne, Chalmers & Co. (Granite), South Quincy, Mass.
Perry, W. H. (Granite), Concord, N. H.
Sarvis, W. H. (Marble), Cincinnati, O.
Sheldon & Sons (Marble), West Rutland, Vt.
Tuler & Co (Marble and Importers of Statuary), New York City.
Townsend, J. F (Marble and Granite and Importer of Statuary), Boston, Mass.
Townsend, Wm. C (Marble and Granite and Importer of Statuary), Carrara, Italy.
Aberdeen, Scotland.
Boston, Mass.
Quincy, Mass.
New York City.
Zanesville, O.
Valido Marble Co., Fair Haven, Vt

Retail Dealers.

Bauhof Bros. & Co., Canton.
Bloom, E., Lancaster.
Bunnell, D. M., Urbana.
Burrell, Roche, New Lexington.
Carabelli, Joseph, Cleveland
Canton Monumental & Mantel Co., Canton.
Cromrine, M. H., Akron.
Davis, A. S., Washington C. H
DeBow Bros., Granville
Eichhorn, Martin, Cincinnati.
Fiala & Hathaway, Piqua.
Frick, Bernard, Columbus.
Goodsell & Sweet, Garrettsville.
Harrington, H., Marysville.
Harris, J. W., Chillicothe.
Halter, J. L., Napoleon.
Halter, J. D., Lima.
Harsha, C. M., Hillsboro.
Harsha, James, Circleville.
Harsha, W. A., Wilmington.
Hornig, J. Vermillion.
Johnson & Sands, Elyria
Johnson & Shoemaker, Beverley.
Kelley & Bentzel, Springfield.
Lieb, A., Sandusky.
Lloyd Bros., Toledo.
Long & Caldwell, Jackson.
McKee, D. L. & Son, Piqua.
McKnight & Smith, Norwalk.
March Jacob, London.
Martin & Clevell, Dayton.
Mason, H. A., Canal Winchester.
Miller, W. W., Mt. Vernon.
Moore, L. A., Zanesville.
Morley, J. B., Andover, Ashtabula county.
Myers, T. C., Cleveland.
Robertson, A. J., Sidney.
Sargeant, John Clyde
Schwartz, Jacob, Lebanon.
Shea, William, Sidney.
Shilling, A. B., Alliance.
Sohn, W. H., Wauseon
Staniland, Thos M., Dayton.
Thum, John, Tiffin.
Thomas, J. J., Wellington.
Underhill, F. W., Elyria.
Wege, Chas., Columbus.
Williams, Jed., Cambridge.
White, Dorr, Kenton.
Wolf & Co., Mechanicsburg
Woodard, Homer M., Columbus

Withdrawn.

McDonald & Buchan (Granite), Barre, Vt
Price & Co., Retail Marble and Granite Dealers, Circleville, O

Dropped.

E. H. Davis, Rutland, Vt
G. W. Douglas, Place of Business Unknown.
Isaac Y. Jenkins, Retail Marble and Granite Dealer, Oak Hill, O.

Out of Business

Producers' Marble Co., of Rutland, Vt.

EDITORIAL OBSERVATIONS.

The *personnel* of the conventions would compare favorably with any body of men of any calling.

The necessity of "hiring a hall" farther removed from the din of the street was here made painfully evident.

Mr. James Sharkey, of Brooklyn, N. Y. is not a very big man physically, but he is "business" from the ground up. We want to see a little more of his determined spirit in the National Association.

Mr. James Harsha, who presided over the deliberations of both conventions, dignified the position by a tolerant spirit and a zealous interest in his rulings. The Ohio Association honored itself in choosing such a man for its presiding officer.

Hon. A. J. Robertson, of Sidney, O., is in position to do yeoman service for the dealers of Ohio, in pushing through proper protective legislation. It is fortunate that such an earnest and influential gentleman can be counted on to use his best endeavors in that direction at this time.

One would not suppose tradesmen whose everyday experience is with the sorrowful side of life, would have much of the jovial spirit left in them. It may seem so, but it is not a fact. Next to the undertakers, we have never met a collection of men more hilariously joyful than this collection of tombstones.

Mr. Homer M. Woodard, secretary of the Ohio Association, presents in his enthusiasm for the work, a splendid example of the loyal member. It is a hard task one takes upon himself to do the clerical work for a hundred men. No one who has never filled such an office has any idea of the enormous labor attached to it. Mr. Woodard's reports are models of systematic and expressive compilation.

Mr. H. D. Pierce, the genial secretary of the National Association, is a worthy "laborer in the vineyard," or, more properly, perhaps, the marbleyard. He has the business of his office completely in hand. It would be a difficult matter, indeed, to find a secretary more nearly approaching the ideal officer than this gentleman. It is to be regretted that the association, whose master spirit he is, should not be in condition to suitably reward him for his arduous services. But it will come to pass, we feel assured, when this will be changed. The work he is doing will be fruitful of good results. Earnest effort on the part of the individual is the inspiration that quickens concerted action. Associations are bound to prosper when the energies of such men as Mr. Pierce are enlisted in their behalf.

As in all associations, so was apparent here, there were individuals who were anxious to secure the weight of associated action to assist their personal grievances against a member. It was a pleasing fact that the conservative, just element were all-powerful, however. Following a man with false accusations, based upon imaginings that he is not as straight as the moral law, are the very acts that will undermine and destroy these associations. Indubitable evidence should be required, before a charge be laid against a member in official form. A man's commercial character should be as sacred from the crowd as his moral character, and neither should be impugned, without the plainest evidence of culpability. Any other course is contemptible and cowardly.

THE NEW ENGLAND DEALERS.

In last month's STONE appeared the official call for the convention of New England dealers to meet at Rutland on the 24th ult.

Prior to the assembling of the convention at the Bardwell House, the visitors inspected the quarries and mills at Proctor and West Rutland. For the following detailed report of the proceedings we are indebted to the *Daily Herald*, of Rutland:

Mr. James F. Brennan, of Peterborough, N. H., chairman of the committee of arrangements, rapped to order about 8 o'clock. He stated that notices of the meeting were sent to 475 dealers, and responses were received from about one-half. Mr. Brennan stated that it was the largest gathering of representative marble men ever held in New England. On motion of F. C. Partridge, Mr. Brennan was made chairman. On motion of John S. Treat, Robert L. Sands of Cambridge, Mass., was elected secretary. Mr. Brennan spoke of the object of an association and thought that one would be a benefit to every dealer who was a member. Mr. S. Moslin, of Hartford, Conn., moved that an association be formed, and it was so voted. A constitution and by-laws which had been prepared were read and acted upon separately. At 10 o'clock 16 articles had been adopted, when the meeting adjourned until 7:30 o'clock A. M. The name adopted is "The Retail and Wholesale Marble Dealers' Association of New England and the Provinces." The object of the association is for the general improvement of the trade in all its departments, the cultivation of friendly relations and the protection of members of the association and their patrons from impositions practiced by illegitimate and irresponsible dealers; also to secure advantages which the dealers as individuals could not obtain. Article 3 provides that any firm or person in New England or the Provinces who owns or leases a shop for a term of not less than a year for the manufacture and sale of marble and has marble work of a value of not less than $300 may become a member of the association. The officers are a president, seven vice-presidents, secretary and treasurer, and a board of directors consisting of 35, five from each of the New England states and five from the provinces. The annual meeting of the association will be held on the fourth Wednesday in July. The membership fee for retail dealers is to be $3 and the dues $1; of wholesale dealers $15 for membership fee and $10 for the annual dues.

At a meeting on Thursday morning the remaining articles of the constitution were adopted, as were also the by-laws. It was voted that a committee of three be appointed by the chairman, of which he shall be one of the members, to take into consideration the constitution and by-laws, and to report at the next annual meeting any amendments deemed advisable. The committee appointed consists of Stephen Moslin, of Hartford, Conn., William Hanley, of Barre Plains, Mass., and J. F. Brennan, of Peterborough, N. H. The association then proceeded to the election of officers, with the following result:

President, Stephen Moslin, of Hartford, Conn.

Secretary and treasurer, William Hanley, of Barre Plains, Mass.

It was voted that the chair appoint a committee of two from each state and two from the provinces to nominate vice-presidents and an executive committee, as provided by the constitution. The committee soon reported the following-named persons to serve as officers and the report was unanimously adopted:

Maine—Vice-president, N. F. Sawyer, of Biddeford. Directors—Geo. Hodgson, of Alfred, S. J. Nason, of South Berwick, E. M. Thompson, of Portland, Ambrose Fogg, of Bangor, W. H. Turner, of Augusta.

New Hampshire—Vice-president, Solomon F. Foye, of Dover. Directors—John S. Treat, of Portsmouth, John F. Morrill, of Laconia, John Emery, of Great Falls, Geo. A. Cummings, of Concord, James F. Brennan of, Peterborough.

Vermont—Vice-president, Geo. C. Underhill, of Rutland. Directors—F. D. Proctor, of Proctor, Franklin Barney, of Springfield, Dan. K. Hall, of Rutland, W. H. Fullerton, of Manchester, H. C. Soper, of West Randolph

Massachusetts—Vice-president, John Kelley, of Weymouth. Directors—R. L. Sands, of Cambridge, A. C. Kinney, of Milford, N. C. Matthews, of Winchendon, Dan. Wall, of Worcester, John D. Allen, of Boston.

Rhode Island—Vice-president, R. G. Toye, of Providence. Directors—C. Harrington, of Warren, J. B. Cartwell, of Newport, G. W. Green, of Woonsocket, A. T. Farnham, of Providence, N. Noyes, of Westerly.

Connecticut—Vice-president, C. D. Burnham, of Hartford. Directors—C. S. Davis, of Niantic, George C. Arms, of Bristol, —— Phillips, of New Haven, Charles Jackson, of Waterbury, J. E. Pine, of Winsted.

For the Provinces—Vice-president, James E. Stanton, of St. John, N. B. Directors—Charles Cairns, of Charlotte, P. E. I., G. A. Sanford, of Halifax, N. S., J. S. Seaton, of St. John, N. B., Oldham Whitman, of Bridgetown, N. S., John Moore, of Fredericton, N. B.

It was voted that the treasurer furnish bonds in the amount of three hundred and fifty dollars ($350) to the satisfaction of the president, for the safe keeping and correct accounting of the moneys of the association in his hands.

It was voted that the president be the custodian of the association's money until the treasurer give the bond required as aforesaid.

It was voted that J. F. Brennan, of Peterborough, be appointed a committee to procure the printing of the constitution, the list of members and the officers of the association, for distribution.

It was voted that J. F. Brennan, of Peterborough, N. H., and R. L. Sands, of Cambridge, Mass., of the preliminary committee on organization, be reimbursed for all necessary expenses incurred in providing for the organization of this association.

It was voted that the association join the National Marble and Granite Dealers' Association, and that it send eight delegates to the national conventiontion, to be held at Buffalo, N. Y., in August next. The following delegates were elected: E. R. Morse, of Rutland, Vt., R. C. Bowers, of Montpelier, Vt., F. C. Partridge, of Proctor, Vt., George E. Royce, of Rutland, Vt., Stephen Moslin, of Hartford, Conn., John D. Allen, of Boston, Mass., J. F. Brennan, of Peterborough, N. H., J. D. Sleeper, of Rutland, Vt.

It was voted that said delegates respectively be authorized to appoint alternates to attend said convention in their stead, if they are unable to attend.

It was voted to meet next year at Springfield, Mass.

On motion, the following resolution was unanimously adopted:

WHEREAS, There are published in Indianapolis, Ind., and Chicago, Ill., journals called STONE and the *Reporter*, dedicated to the interests of those engaged in the producing, working and using of stone, marble and granite, and

WHEREAS, Said journals are of high literary merit and contain information valuable to all dealers, therefore, be it

Resolved, That we, the Retail and Wholesale Marble Dealers' Association of New England and the Provinces, give our hearty indorsement to these journals, and cordially recommend them to all dealers.

It was unanimously resolved that the hearty thanks of the association are due to Governor Proctor for his thoughtful generosity and kind attention to the members on this trip, and to the Vermont Marble Co., Sheldon & Sons, the True Blue Marble Co., Ripley Sons and Gilson & Woodfin, who contributed so much to their entertainment and pleasure. Also, to Landlord Carpenter for the kind attention received at the Bardwell House.

On motion, the convention adjourned *sine die*.

A GENEROUS OFFER.

They were riding together in the moonlight, and he was trying hard to think of something pleasant to say. All of a sudden he gave a little shiver.

"Are you cold, Miss Hattie?" he asked anxiously. "I will put my coat around you if you like."

"Well, yes," said she, shyly, with another little shiver, "I am a little cold, I confess; but you needn't put your coat around me. One of the sleeves will do."—*Somerville Journal*.

Edison's agent—"Wouldn't you like to buy a phonograph? It will store up everything you say and repeat it to you. Want one?"

Omaha man—"No; got a wife."—*Omaha World*.

CARRARA MARBLE.

THE center of interest of the marble trade of the world is at Carrara, Italy. Here is found not only the best and purest marble but it is in the greatest abundance. When we speak of Carrara marble we think of the white, or statuary marble, which is so famous, but in the Carrara region is found stone of many varying colors known by many different names. The whole range of the Appenines is very rich in deposits of marble but the center of interest is, as said before, Carrara. In the country immediately around this point there are 550 quarries of which all but two belong to the Carrara district proper. The annual production of this district is 170,000 tons. The quarries are simply so many holes cut into the sides of the mountains. The stone is loosened by the ordinary process of blasting and the marble is then allowed to slide down the mountain by its own weight. This is the cause of great waste, much of the stone being badly broken by the fall and rendered unfit for shipment. Then it causes flaws and vents which develope in the working.

These quarries have been worked since 283 B. C. soon after the country fell into the hands of the Romans. Since that time most of the best works of art have been carved from stone from this region. The statuary marble needs no description. The best is of an even white tone with a slightly yellowish tinge. It comes also in a sugary white tint, but this is unfit for statuary purposes, in that it is liable to strains and rapidly falls into decay. It is soft and easy to work and is often selected for this reason for uses to which it should *not* be put.

There is produced in this region a marble of dark blue color with veinings which differ but little in color from the ground. It is known in England as Dove marble. It is used but little. The marble known as "Serravezza Breccia" comes from this region. It was used in the decoration of the Paris Grand Opera House. In the valley of the Stazzeme is found a beautiful greenish white marble which through the blending of the green and white tints, produces a very beautiful effect. It is, however, rarely found of compact texture. One of the most beautiful stones has a ground varying from a cream white to a yellowish brown, marked with purple veins with here and there a greenish tinge. It is often used for the panels of walls and produces an exceedingly rich effect.

The "Porter marble" comes from Porto Venere. The ground is of a rusty black with spots of light brown. The veins run from white through every shade of yellow to dark brown. The marble known as Verd Antique comes from this region. This stone is very even in quality and beautiful in coloring. There are other varieties of stone too numerous to be mentioned. As said before, this whole range of mountains is extremely rich in marble. It is here in inexhaustible quantities. Were it worked by improved methods and taken to the seashore with less waste, the effect upon the marble market would be appreciable.

The people of this region are a rude, hardworking race. They work for small wages and through long hours. The quarry owner contracts with a "boss" to get out the stone for a certain price. The boss in turn hires his men and superintends the work. It is considered a dangerous business from the state of the quarries.

"You have a very large mouth," remarked a Williamstown dentist to a lady.

"Indeed!" was the indignant response.

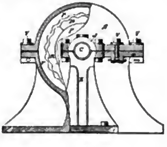
"Yes," pursued the dentist, "while I have been filling this tooth of yours my operations have extended over an acher."

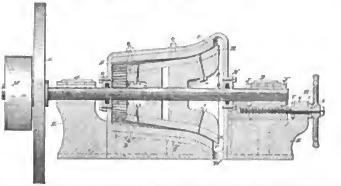
There was no further use for ether.—*Breakfast Table*.

REGENT PATENTS.

ISSUE OF JULY 3, 1888.

No. 385,638—Stone and Ore Crushing and Pulverizing Machine. Frank B. Meech and Alfred H. Meech, Cleveland, O. Filed Jan. 5, 1888.

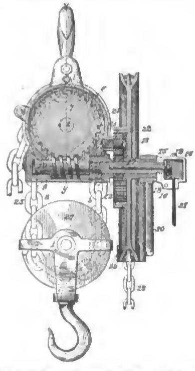




Claim.—In a stone and ore pulverizing machine, an outer shell provided with plates having corrugations throughout a portion of their length, the remaining portion being plain, an inner shell provided with like plates adapted to rotate in the outer shell, whereby one portion of the plates is utilized for crushing the material and the other portion for pulverizing, as set forth.

ISSUE OF JULY 10, 1888.

No. 385,856—Hoisting-Tackle. James T. Hambay, Pittsburg, Pa. Filed Aug 13, 1887.



Claim.—1. In a hoisting-tackle, the combination of the sprocket-wheel, a worm-and-gear mechanism for rotating said wheel, and a chain passing around the sprocket-wheel, and having one end connected to the frame of the sprocket-wheel, said worm-and-gear mechanism serving not only to rotate the sprocket-wheel, but also as a stop for holding the load at any desirable point, substantially as set forth.

2. In a portable hoisting-tackle, the combination of a sprocket-wheel, a worm-and-gear mechanism for rotating said wheel, a power-wheel mounted on the shaft of the worm and having a speed-connection to said shaft, and a power-connection thereto through interposed gearing, substantially as set forth.

3. In a portable hoisting-tackle, the combination of the sprocket-wheel, a worm-and-gear mechanism for rotating said wheel, a power-wheel and a pinion loosely mounted on the shaft of the worm, suitable gearing connecting the pinion and power wheel, and a movable key for locking either the pinion or power-wheel to the shaft of the worm, substantially as set forth.

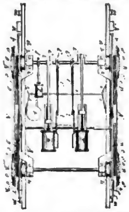
No. 386,039—Composition for Artificial Marble. Leon Van Den Steen, Laeken, Brussels, Belgium. Filed Sept. 16, 1887. Patented in Belgium May 18, 1886; in Russia, Oct. 11 and 23, 1886, in France, Jan. 6, 1887; in Austria-Hungary, Jan. 8, 1887, and in Italy Jan. 19, 1887.

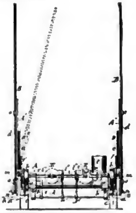
Claim.—1. A composition forming artificial marble, consisting of plaster-of-paris or gypsum and a liquid compound of glue, rosin, turpentine, and water, substantially as set forth.

2. A composition forming artificial marble, consisting of plaster-of-paris or gypsum, glue, rosin, turpentine, a coloring-matter, and water, substantially as described.

ISSUE OF JULY 17, 1888.

No. 386,312.—Stone Channeling Machine. Cyrel W. Green, West Rutland, Vt., assignor of one-half to Duncan M. Schell, same place. Filed Dec 27, 1887.





Claim.—1. A stone-channeling machine composed of a stationary track, a carriage having carrying-axles, with wheels mounted on said track, cranks or eccentrics on one of said axles, the motor on the carriage, connected with the cranks or eccentrics, levers for reversing the valve-motion of the motor, and cutters sustained rigidly on the carriage, substantially as described and shown.

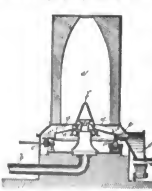
2. The combination of the track *a a*, carriage A, mounted on said track, the cutter bars B B, supported movably longitudinally on the carriage and provided with racks *d d*, shafts *c c* pivoted to the carriage, pinions *c′ c′* on one end of the shafts, engaging the racks *d d*, ratchet-wheels D D, connected to the opposite ends of the shafts, levers *f f*, pivoted to the carriage, pawls *g g*, connected to the levers and engaging the ratchet-wheels, and inclines *h h* in the path of the carriage and in position to be encountered by the free ends of the levers *f f*, substantially as and for the purpose set forth.

3. The combination of the track *a a*, carriage A, provided with a driving axle I, engines E E on the carriage and connected with the driving axle, links *l l*, connected with the valve-gears of the engines, stops *m m* in the path of the carriage, a lever for shifting said links, and a push-bar adapted to come in contact with the aforesaid stops in the travel of the carriage, and thereby actuate the said shifting-lever, substantially as set forth.

4. In combination with the track-rails *a a*, formed with the horizontal flanges *a′ a′*, the carriage A, having carrying-axles, with wheels mounted on the aforesaid rails, the shaft K, journaled on the carriage parallel with the axle, and rollers *c c* on said shaft, bearing with their peripheries on the under side of the aforesaid flanges of the track-rails, and the cutter-bars B B, secured to the carriage, substantially as described and shown.

ISSUE OF JULY 24, 1888.

No. 386,665—Limekiln. Ernest Solvay, Brussels, Belgium, assignor to the Solvay Process Company, Syracuse, N. Y. Filed March 29, 1888. Patented in Belgium Aug. 26, 1887, No. 78,672; in France Aug. 26, 1887, No. 185,507, and in England Oct. 1, 1887, No. 13,322.



Claim.—1. The combination, with a limekiln, of a revolving disk placed in the bottom of the kiln and provided with means for forcing the lime gradually from the center to the outer edge of the disk, substantially as and for the purpose set forth.

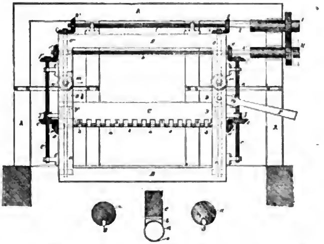
2. The combination, with a limekiln, of a revolving conical disk in the bottom of the kiln having a horizontal annular flange, tangent wings for forcing the material out to and upon the annular flange, and a scraper to sweep the lime off said flange at the point of discharge, substantially as and for the purpose set forth.

3. The combination, with a limekiln having its inner sides made vertical at the lower end, of a revolving disk in the lower part of the kiln for automatically discharging the material, substantially as and for the purpose set forth.

4. The combination, with a limekiln having its lower end made air-tight, of an air-blast pipe introduced into the lower end of the kiln, and having a discharge nozzle or cone b' connected to the blast pipe and extended up into the center of the charge under operation, substantially as shown and described.

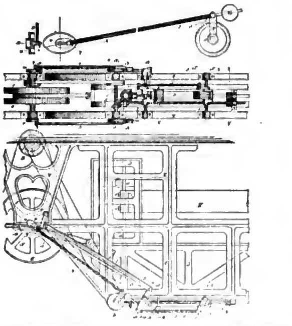
5. The combination, with a limekiln, of a cone projecting into the lower center thereof and connected to an air-blast, and a revolving disk surrounding the cone and adapted to continuously work the lime outward to a discharge-point, substantially as and for the purpose set forth.

No. 386,532—Stone Sawing Machine. William Flynn, New York, N. Y., assignor of one-half to Thaddeus A. Jackson, same place. Filed Sept. 17, 1887.



CLAIM.—The combination, with the reciprocating saw of a stone-sawing machine and bearing-plates, substantially as specified, fastened at convenient distances along the edge of said saw, of a cylindrical rod extending through the whole length of the edge of said saw, mounted in bearings on the sash of said saw, running in bearings in said bearing-plates upon the edge of said saw, armed with diamond-bort and similarly hard material, revolving continuously in one direction around its own axis, moving lengthwise with said saw in its reciprocating motion, and being guided by the said saw and the said bearing-plates in the edge thereof, forming the cutting-edge of said saw, substantially as and for the purpose set forth.

No. 386,542—Stone-Sawing Machine. Thaddeus A. Jackson, New York, N. Y. Filed Aug. 17, 1887.



CLAIM.—1. The combination, with a wheel revolving upon a shaft and having an eccentric periphery, of an oscillating lever attached pivotally by one end to a proper support and having at the other end a friction-wheel rolling upon the face of the eccentric wheel, a connecting rod communicating motion to a bell-crank, the said bell-crank, and the means connected therewith, substantially as hereinbefore described, to lift the saw of a stone-sawing machine for its clearance, substantially as and for the purpose set forth.

2. The combination of the radial slot and the eccentric periphery hereinbefore described in one wheel, whereby the one wheel by means of the mechanism hereinbefore described is enabled to feed the saw, and also to lift the saw for its clearance, substantially as and for the purpose set forth.

3. In a stone-sawing machine, the wheel a mounted upon a revolving shaft and having the radial slot a', in combination with the wrist-bolt b, the connecting rod h', the ratchet-wheel c, the pawl c', the lever h^2, the shaft l and its bearings, the bevel-wheels l' h^3, the shaft h' and its bearings, the spur-wheel h, the spur-wheel i and its bearings, the shaft f' and its bearings, the bevel-wheels f^2 f^3, the screws m and their bearings, the nuts n, the saw B, and the reciprocating frame or sash C and its supports, substantially as and for the purpose set forth.

4. In a stone-sawing machine, the combination of the wheel a, mounted upon a revolving shaft and constructed with an eccentric periphery, with the lever d and its pivotal support, the friction-wheel d^2, the connecting rod e, the lever o, the arm e' the shaft o' and its bearings, the connecting rod f, the bell-crank f^2 s, the shaft r and its bearings, the bar g, the roller k, and the rod g' and the reciprocating frame or sash C, with its supports, substantially as and for the purpose set forth.

◆

THE CITY OF THE DEAD.

They do neither plight nor wed
In the City of the Dead.
In the city where they sleep away the hours;
But they lie, while o'er them range
Winter blithe and summer change,
And a hundred happy whisperings of flowers.
No, they neither wed nor plight,
And the day is like the night,
For their vision is of other kind than ours.

They do neither sing nor sigh,
In that Burgh of By and By,
Where the streets have grasses growing cool and long;
But they rest within their bed,
Leaving all their thoughts unsaid,
Deeming silence better far than sob or song.
No, they neither sigh nor sing,
Though the robin be a-wing,
Though the leaves of autumn march a million strong.

There is only rest and peace
In the City of Surcease
From the failings and the wailings neath the sun,
And the wings of the swift years
Beat but gently o'er the biers,
Making music to the sleepers every one.
There is only peace and rest;
But to them it seemeth best,
For they lie at ease and know that life is done.

—*Richard E. Burton, in The Century.*

◆

IMPORTED LABOR.

The Maine Labor Bureau has a new feature of the labor question to handle which has lately developed. It is the outcome of the employment of what are called Italian soft stone cutters by the granite cutters. Numerous complaints have been received from workingmen in various sections of the state concerning the matter. It is alleged that contracts are made with the "Padrons" to furnish a certain number of men at a stated price; that the Italians are brought into the state and taught the trade of stone cutting, at which they become very skilful; that they accept very low wages, thus crowding out the American workmen.

◆

A CARD.

The disagreement between the partners in the firm of Carabelli & Broggini, which led to the appointment of a receiver, has been amicably adjusted, Mr. Joseph Carabelli the undersigned, purchasing the entire plant and good-will of the late firm, and continuing the business, as heretofore. Improvements will be made in various directions, and the present proprietor will make every effort to give satisfaction to buyers of monuments.

Very truly, JOSEPH CARABELLI.

Cleveland, O., July 1.

◆

MARBLE AND MARBLE WORKERS. By Arthur Lee, author of "A Visit to Carrara," "The Working of Marble," etc. 143 pages. Price 75 cents. Published by Crosby, Lockwood & Son, 7 Stationers' Hall Court Ludgate Hill, London, E. C.

This work is particularly valuable as representing in concise form the studies and experience of the writer during the past fifteen years. He has visited the principal European quarries and become practically acquainted with their methods, and has pursued his investigations in the same lines into the American productions. This book fills the want of a work of handy reference, and is evidently prepared by one who has felt the same want himself.

MUCH LOWER PRICES.

We notice in a circular that a stone dealer says that a comparison of his prices with those of his competitors will show that he is selling much lower than they. That is a very foolish thing to say. In the first place, he doesn't have to sell very much lower in order to do business. The man who has to sell goods very much lower than his competitors, or who has to represent that he does, is a failure, either in fact, or in theory. Where one makes are presentation of this kind he prepares the buyer's mind for prices much less than the goods are worth and if the promise is not more than sustained, there is dissatisfaction. Then again, every one is suspicious of a man who is proposing to sell very much cheaper than his competitors. Those who do the largest business in any line in this country are those who are getting good prices for their product. They get the business through push. They represent that they have a good thing and want a fair price for it, and by so doing command the respect of every one. They do not lay themselves open to suspicion. We remember to have heard a gentleman say that he could always get a better price from those who were reputed to be close buyers than the other class. When we asked for an explanation he stated that it was from the fact that as a general principle such buyers usually intended to purchase anything on which they would ask a price, and they would buy at the best price they could get; that if a seller did not get a good price from him it was his own fault. He further stated that a close buyer always expects that he is making a good deal and would generally believe it himself whether he was or not. And for this reason he was always a satisfied person even at high figures.

INARTISTIC DESIGN.

An inspection of the illustrated circulars of designs for monumental work and the work in our cemetries will bear out the assertion that there are very few designs executed which bear evidence of being the work of a skilled designer. The forms are crude and without idea. The moldings and ornamentation are for the most part clumsy and altogether ugly. It is evident that there are few educated designers who are devoting their attention to work of this class. The assertion that the large proportion of the work of this class is ugly and inartistic, will be denied by a great many. If that were not true, if this large number were conscious that the work is inartistic, there would not be so much of it. But it may be said that it sells. That which we see has been sold, evidently. If the work were of an artistic character; if the better class of designers were engaged in the business of making monumental designs, many sales would be made to people whose tastes are offended by the general clumsy array.

◆

Business is progressing finely at the Voodry quarry, which has now assumed the name of Woodbury (Vt.) Granite Quarry, being owned by a stock company.

INQUISITIVENESS REBUKED.

Officer—"Look 'a here, you! What are ye doin' 'round here this time o' mornin'?"

Stranger (boldly)—"I'm tendin' to me bizness! Wat yer s'pose?"

Officer—"Oh, ye are! Where did that chicken come from?"

Stranger (with more under his coat, savagely)—"It come from a neg, av course! What'n blazes did yer tink it come from? A sody-fountain?"—*Puck.*

A NEW LIFE.

Magistrate—"You have been arrested a good many times, Uncle Rastus."

Uncle Rastus—"Not lately, yo' honah. Yo' see I 'sperienced religion 'bout a yeah ago, an' I don' s'pose I'se ben 'rested mo'n free or fo' times since. I'se leadin' a dif'runt life, sah."—*New York Sun.*

A LUCID EXPLANATION.

Teacher (to class)—"In this stanza what is meant by the line 'The shades of night were falling fast?' "

Bright scholar—"The people were pulling down the blinds."—*Tid-Bits.*

◆

Mrs. McSwyny—"Oi'm towld your choild fell out o' the top windy, Mrs. Clinchy?"

Mrs. Clinchy—"Yis; an' av me little mon hadn't coom along jest at the roight time, an' broke the fall wid the top av his head, me bye'd been kilt."

"Didn't it hurt yer hoosband, now?"

"Oi don't think so. It broke his neck, an' he died widout a groan."—*Zion's Herald.*

◆

Higgins (meeting his friend Wiggins in restaurant)—"By Jove, Tom! I should think you'd be afraid to eat that dish. It's fatal!"

Wiggins—"What's the matter? It's only spare ribs and apple sauce."

Higgins—"Well, isn't that just what knocked out Adam?"—*Judge.*

◆

"Papa," said the beautiful girl, as she laid her blushing face on her father's shoulder, "would you object to Mr. Hankinson as son-in-law?"

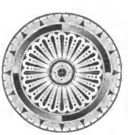
"N-no, I guess not," said the old gentleman, apathetically, "he might as well be costing me something in groceries as in gas and hard coal."—*Chicago Tribune.*

◆

The new electric style of hanging will possess this beauty:

Stranger (to lady in mourning)—"I infer, madam, that you have recently lost a husband."

Widow (sadly)—"Ah, yes, sir, my poor husband was struck by lightning."—*Epoch.*



CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT.	STRUCTURE.	COST.
Chicago	John Frick	F. Folhringer	Store and Flats	$ 10,000
Chicago	L. W. Kadlec	W. H. Drake	Store and flats	18,000
Chicago		E. C. Johnson	Residence	10,000
Chicago	A. McIntosh	R. G. Pentecost	Store and flats	35,000
Chicago	F. L. Campbell	W. D. Cowles	Residence	20,000
Kansas City, Mo.	H. F. Whitney	W. F. Hackney	Office building	125,000
Kansas City, Mo.	The county	County Clerk	Court house	500,000
New York City.	Bank of America	C. W. Clinton	Bank Building	400,000
New York City.	H. D. Helmke	A. B. Ogden & Son	Store and flats	40,000
New York City.	Thos F. Hayes	Thos. E. Thompson	Factory	45,000
New York City.	Smith & Sills	J. E. Terhune	Stable	25,000
New York City.	Trinity Church	Parish Secretary	Church and school	300,000
New York City.	John S. Scott	J. C. Burne	Store and flats	25,000
New York City.	John S. Scott	J. C. Burne	Flats	48,000
New York City.	F. H. Allen	Jas. W. Cregin	Residence	40,000
New York City.	Quackenbush Bros	G. Robinson, jr.	Stores and flats	20,000
New York City.	Edward Rothschild	Buchman & Geisler	Business block	20,000
Detroit, Mich.	First Cong. Society	Allen Bourn	Church	100,000
Detroit, Mich.	Unitarian Society	Rev. Reed Stuart	Church	80,000
Cincinnati, O.	The Scottish Rite Masons	Crapsey & Brown	Cathedral	15,000
Cincinnati, O	Samuel H. Taft	Theo. A. Rechter	Store and flats	12,000
Cincinnati, O.	C. P. Dickson	D. S. Schureman	Office building	25,000
Logansport, Ind.	D. C. Elliott	Crain & Krutsch	Business block	20,000
Brooklyn, N. Y.	Charles Isbill	D. Acker & Son	Residence	25,000
Albany, N. Y.	The city	City Clerk	Granite pavement	
Albany, N. Y.	The Argus Co.	I. G. Perry	Business block	50,000
Findlay, O.	Second Cong. Society	Kramer & Zoll	Church	8,000
Findlay, O.	T. C. & S. R. R. Co.	Vincent Wyss	Station	10,000
Toronto, Can.	Board of Trade	Building Committee	Chamber of com.	200,000
Detroit, Mich.	St. Peter's P. E. Society	Wm. C. Maybury	Church, etc.	100,000
Detroit	C. A. Ducharme	Mason & Rice	Residence	20,000
Detroit	St. Paul's P. E. Society	Hess & Raseman	School building	25,000
Washington, D. C.	St. Mark's Church		Church	20,000
Washington	B. W. Keyer		Business block	60,000
Washington	The city	District Commissioners	Engine house	
Washington	J. A. Buchannan		Residence	10,000
Washington	Chas. E. Foster		Business block	25,000
Washington	John Miller		Business block	15,000
Washington	Jacob Jones		7 Residences	14,000
Washington	W. C. Hill		Residence	25,000
Washington	B. H. Warner		Residence	20,000
Washington	The Randall estate	A. B. Mullet	Hotel	75,000
Decatur, Ala.		C. C. Austin	Market house	12,000
Henderson, Ky.	J. R. Barrett		Residence	14,000
Mobile, Ala.	A. C. Danner		Dry dock	60,000
San Antonio, Tex.	The city	O. Kramer	City hall	100,000
Reamey, Neb.	The county	H. T. M. Fuehrmann, Grand Island	Court house	65,000
Wichita, Kan.	The county	County clerk	Court house	200,000
Dayton, Tenn.	R. L. Allen	T. C. Veale, Chattanooga.	Hotel	18,000
Grand Forks, Dak.	Syndicate	H. G. Carter, St. Paul	Hotel	100,000
Portland, Me.	Maine Central R. R.	Winslow & Wetherell	Office building	
Indianapolis, Ind.	Jay Voss	L. H. Gibson	Hotel	50,000
Hartford, Conn.	E. L. Hooper	John C. Mead	Hotel	80,000
Boston, Mass.	Den. W. Ross		Hotel	150,000
New Bedford, Mass.	H. M. Brown		Hotel	60,000
Cleveland, O.	Society of Savings		Bank building	700,000
Boston, Mass.	The city	McKim, Mead & White	Public library	21,00,000
Cleveland, O.	St. John's Catholic Parish	B. Van Develde	Chapel	35,000
Little Rock, Ark.	First Baptist Society	Rev. J. K. Pace	Church	25,000
Erie, Pa.	A. B. Falgemaker	Dean & Son	Factory	20,000
Buffalo, N. Y.	Buffalo Cast Iron Pipe Co.		Factory	25,000
Council Bluffs, Iowa.	N. Merriam	C. E. Bell	Business block	100,000
Lincoln, Neb.	R. O. Phillips	H. H. Haukins	Residence	40,000
Cleveland, O.	F. S. Sandford	B. Van Develde	Residence	7,000
Duluth, Minn.	Stenson & Pastoret	O. G. Traphagen	Business block	100,000
Davenport, Iowa.	Calvary Baptist Society	Uriah Rorabaek, sec'y.	Church	25,000
New Haven, Conn.	N. H. & Derby R. R.		Depot	
Galveston, Tex.	The state	Board of Regents University	Medical college	50,000
Ballinger, Tex.	The county	W. L. Towner, clerk	Court house	30,000
Racine, Wis.	Mechanics' Building Ass'n	J. S. Chandler	Theater	20,000
Elisabeth, N. J.	The city	D. D. Provost	School house	20,000
Council Grove, Kan.	Board of Education	J. H. Leedy	School house	15,000
Baltimore, Md.	Brantly Baptist Church		Church	25,000
Rome, Ga.	First National Bank		Bank	
Rome, Ga.	Simpson, Glover & Hight		Business block	12,000
Macon, Ga.	Washington Lodge No. 28 A. O. U. W.		Hall	10,000
Fairview, W. Va.	The county		Jail	
Laredo, Tex.	Mexican Nat. Railroad Co.		Car and mach. shop	600,000
Lincoln, Neb.	Christian church	O. C. Placey	College	50,000
Baltimore, Md.		Benj. B. Owens	Residence	20,000
Denver, Colo.	St. Joseph's Parish	Father Malone	Church	30,000
Ithaca, N. Y.	Cornell University	W. H. Miller	Library	212,000

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT.	STRUCTURE.	COST.
Kansas City, Mo.	C. B. Adams	A. Van Brunt	Business block	$ 75,000
Bridgeport, Conn.	First Presbyterian Society	J. C. Cady & Co., N. Y.	Church	35,000
St. Paul, Minn.			Business block	70,000
Ft. Worth, Tex.	B. C. Evans		Business block	60,000
Ann Arbor, Mich.	Women's Board of Mission	W. G. Malcomson, Detroit	Church	20,000
Corsicana, Tex.	The State	E. Northcraft.	Orphan Asylum	
Herrington, Kan.	M. D. Herrington		Residence	25,000
Glens Falls, N. Y.	St. Alphonse Society	E. Hoffman	Church.	
Minden, Neb.	Jensen Bros.	Campbell & Gebhonen	Hotel and stores	25 000
Kansas City, Mo.	A. A. Lyons	A. B. Cross	Residence	15,000
Kansas City, Mo.		E. P. Brink	Business block	36,000
Kansas City, Mo.	C. W. Baker	Frank Hart	Residence	30,000
Henderson, Ky.	Wm. Soaper		Residence	12,000
Hot Springs, Ark.		The Mayor	City Hall	
Madison, Ga.	W. A. Broughton		Hotel	50,000
Vienna, Ga.	The County.		Court House	25,000
Anderson, S. C.	Masons		Hall	15,000
Camden, Ala.	The County		Jail	13,500
Springfield, Mo.	Society of the Sacred Heart.		Church	125,000
Anniston, Ala.	Bank of Anniston		Bank	
New York, N. Y.	C. & A. Ruff	Schneider & Herter	Flats	23,000
New York.	S. W. Waldron	G. A. Schellenger	Flats	100,000
New York.	22d Regiment N. Y. S. G.	The Commander	Armory	100,000
New York.	Matthew Murray	J. M. Dunn	Flats	36,000
New York.	L. K. Ungrich	M. L. Ungrich.	Flats	18,000
Chicago	E. K Buttler	T. N. Bell	Residence	30,000
Chicago	Geo. Miller	W. A. Furber	Residence	18,000
Chicago	John DeWitt	R. Rae Jr.	Stores and Flats	150,000
Chicago	Historical Society		Library (contem'd)	150,000
Springfield, Mass.	Catholics	Jas. Murphy, Providence	Church	125,000
Evansville, Ind.	Grace Presbyterian church	Reid Bros.	Church	12,000
Minneapolis	Ed. Merrill		Residence	35,000
Minneapolis	Masonic Temple Association		Office & Hall B'ld'g.	300,000
Minneapolis	Blaisdell& Wallace	Alex. Murray	Business block	200,000
St. Louis	J. C. Wilson	Legg Arch Co.	Business block	30,000
St. Louis	Conn. Mut. L. Ins. Co.	L. C. & C. M. Bulkley	Business block	30,000
St. Louis	H. L. Fox	G. C. Heimburger	Business block	75,000
New York	Squier & Whipple	J. H. Taft	Residences	200,000
New York	Manhattan club	Wm. J. Swan, Chairman	Club House	250,000
Topeka, Kan.	Geo. W. Veale	J. G. Haskell	Office building	35,000
Bloomington, Ill.	First Nat. bank	W. H. Milner	Bank building	40,000
Barnesville, O.	M. E. Church	S. R. Badgley, Cleveland,	Church	20,000
Cincinnati, O.	W. Glenn, Est.	Hannaford & Son	Stores and flats	20,000
Toledo, O.	Thos. Emory's sons	J. B. Steinkamp, Cincinnati	Residences	30,000
Brooklyn, N. Y.	A. C. Bunnell	Peter Gardner	Flats	20,000
New York	Michael Regan	A. B. Ogden & Son	Flats and store	48,000
New Yerk	Ed. Van Ingen	R. H. Robertson	Residence	65,000
New York	E. L. Striker	Geo B. Pelham	Flats	110,090
New York	E. L. Striker	Geo. B. Pelham	Stores and flats	88,000
Phila. Pa.	W. H. Kemble	J. H. Windrim	Residences	50,000
Phila	J. B. Lee & Son	Angus S. Wade	Stores and flats	20,000
Dallas, Tex.	North Texas Nat. Bank		Bank bui'ding	100,000
Evansville, Ind.	Business men's association.		Chamber of com.	
Castleton, N. Y.	The City		Soldiers' monument	2,500
Amsterdam, N. Y.	Y. M. C. A.		Hall	20,000
Nashville, Tenn.	Y. M. C. A.		Hall	60,000
Los. Angeles, Cal.	Sisters of Mercy	Curlett, Eisen & Cuthbertson	School house	150,000
New Albany, Ind,	M. E. Church		Church	15,900
Phila, Pa.	The Catholics	P. A. Welsh	Church	80,000
Conshohocken, Pa.	Presbyterians	Chas. W. Bolton, Philadelphia	Church	10,000
Utica, Ill.	The Catholics	Rev. Moynhan	Church	10,000
Buffalo, N. Y.	P. H. Griffin	Green & Wicks	Residence	10,000
St. Joseph, Mo.	Potter, Hosea & Co.	Eckle & Mann	Business block	60,000
Bryn Mawr, Pa.	M. Garber	F. K. & W. L. Price, Philadelphia	Residence	6,000
Berwyn, Pa.	G. W. South.	Moses A. King, Philadelphia	Residence	8,000
Chicago	A. Moses	R. G. Pentecost	Three residences	18,000
Chicago	The city	J. J. Flanders	School	90,000
Chicago	Emanuel Cong.	Fred Ahlschlager	Parsonage	6,000
Chicago	H. Kasch	Fred Ahlschlager	Residence	7,500
Chicago	C. Olsen	Ostling Bros.	Flats	10,000
Chicago	W.M. Kern	C. O. Hansen	Flats and store	10,000
Chicago	C. W. Barrett	F. B. Townsend	Flats	15,000
Chicago	The city	J. J. Flanders	2 Schools	100,000
Chicago	A. Bennett	L. H. Heinz	Flats and stores	18,000
Chicago	Little Sisters of the Poor	E. F. Durang	Chapel	65,000
Brooklyn, N. Y.	David Weild		Flats	25,000
Wheatfield, Ind.	German Luth. Cong.	Fred Ahlschlager Chicago	Church	4,000
Germantown, Pa.	H. F. McCann	P. A. Welsh	Residence	
Philadelphia, Pa.	The city	Geo. T. Pearson	Home for cripples	10,000
Philadelphia	Presbyterian Cong.	C. W. Bolton	Church	
Philadelphia	Diocese of Pennsylvania	P. A. Welsh	Church	
New York City	Philip H. Smith	A. Spence	4 stores and flats	60,000
New York City	Charles Galwen	Thos. Wilson	Flats	22,000
New York City	A. D. Russell	Renwick & Aspinwall	Residence	15 000
New York City	Matthew Murray	J. C. Burne	Flats	36,090
Brooklyn, N. Y.	Geo. Grabs	D. Acker & Son	Flats	14,000
Brooklyn, N. Y.	Orson Bried	Marshall & Waters	Factory	40,000

PRICE CURRENT.

ARTIFICIAL STONE.

(C A Stevens, Lansing, Mich.)

	Sq ft
Sidewalks	12½c
Building stone, plain	20 c

BLUESTONE.

New York	45c
Wyoming Valley	

[Forest City Stone Co., Cleveland, O.,]
(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches	20
	Sup ft.
Flagging, 4 to 6 inches thick, any size up to 12 ft. long	12c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	40
No. 2. " "	30c
No. 1. Monument Bases, broken to size	45c
No. 2. " " " "	35
Engine beds, broken to size	40
Perch or Wall Stone, per ton railroad weight	60c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	60

Union Bluestone Co., New York.

Flagging.

Rough Flag, promiscuous sizes	$ 9
Smooth " " "	10
2 and 2.6 Smooth Flag, 1½ in. and over	12
3 " 3.6 " under 1½ in. thick	11
3 " 3.6 " 1½ in. and over	13
Cess-Pool Flag, 2 to 2.6 in. square, 3 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1½ and under 1¾ in. 2 ft. and over wide, wide	13
4 and 4.6 in., smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in.	23
5 ft. " " " 3 in.	25
5 and 5.6 Smooth Flag, 2 in. and over	17
5 and 5.6 " " under 2 in.	15
6 and 6.6 " " 2 in. and over 18	18
6 and 6.6 " " under 2 in.	16
Well Stone, 3 to 3½ in. thick, 4 to 4.6 in. square	24
Well Stone 3 to 3½ " 5 to 5.6 "	28

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag.

6 ft. to 6.6, x 5 to 6 ft. wide	$ 22
7 ft. to 7.6, x 4 to 5 ft "	24
8 ft. to 8.6, x 4 to 6 ft. "	28

The above to be 2½ inches thick.

Promiscuous Large Flag

30 to 50 ft. 3 in. thick	28
50 to 70 "	38
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thickness at special prices.

For planing add 22 cents.

For rubbing add 35 cents.

Window Sills and Lintels.

3 x 8 in. Quarry cut	22
4 x 8 in. " "	21
5 x 8 in. " "	29

¼ in. allowance in thickness.

Door Sills.

5 x 12 in. Quarry cut	3½ cts. per in. in width
5 x 14 in. " "	
5 x 16 in. " "	

8 to 10 ft. long, add 10 cts. per foot

Curb, Quarry Cut.

Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in. thick	27
14 " under 4 in. "	28
14 " 4 in.	32
18 " bev'd, under 3½, 3 ft. and over, long	31
16 in. Curb, 3½ to 4, 4 ft. and over, long	33
18 " 3½ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	56
16 in. Corners, per set	5 50
20 " "	8 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.

12 in. gutter, 3 to 3½ in.	17
12 in. " thin	11
14 in. " 3 to 3½ in. 3 ft. and over, long	20
14 in. " thin, 2.6 and over, long	18
16 in. Belgian Bridge, 4 in. thick	44
20 in. " " 4 in. thick	56
24 in. " " 4 to 4½ in.	65
24 in. " " 5 to 6 in.	77
24 in. " " 7 to 8 in.	90
19 in. Bridge Flag Joints, 3½ in.	28
20 in. " " " 3½ in.	40
24 in. " " " 4 in.	50

Coping.

11 in. Coping, 2 to 3 in.	28
14 " 2½ to 3 in.	29
16 " 2½ and under 3½ in.	40
16 " 3½ to 4 in.	45
18 " 2½ to 4 in.	50

20 in. to 36 in. Coping, 6 in. thick, 3½ cents per in. in width. When ordered over 4 in. thick, special price will be given.

When ordered under 4 in. thick, 3 cents per in. in width.

Steps.

6 x 12 in. promiscuous lengths, under 6 ft.	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft. and up to 10 ft. long, add 10 cents per foot.

Rock.

Promiscuous Rock, per in. in thickness	9
Dimension Rock, per in. in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 Inches Thick

Under 20 feet	30
20 feet and under 35 feet	35
35 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price

Above, if dimension both ways, add 10 per cent.

For 5 in. add 10 cts.
" 6 " 20
" 7 " 30
" 8 " 40
" 9 " 55
" 10 " 65
" 12 " 100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.

4x8 in.	42
5x8 in.	50
5x9 in.	60
5x12 in.	77

½ in. allowance in thickness.

Rubbed Lintels.

3½ to 4 x 10½ in. under 8 ft.	48
8 ft. and under 10 ft.	60
4 in. x 13 in. under 8 ft. in length	67

Rubbed Curb.

2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in.	48
12 " " " 4 in.	55

Rubbed Mantels.

4 x 10 in.	56
4 x 12 in.	65
4 x 14 in.	75

Dimension lengths with heads, measure heads.

Rubbed Hearths.

3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4.6 in. long, 1.4 to 2 ft. wide	33
" 4.6 to 5.6 " 1.4 to 2.6 in wide	40
" 5.6 to 6.6 " 1.4 to 3 ft. wide	45
" 6.6 and under 8 ft long, 2 to 4 ft. wide	65

Rubbed and Jointed Tile.—Boxed.

Under 2½ in. thick, 12 to 30 in. square, per superficial ft.	58

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.

3 ft. and 3 ft. 6 in., 1 ft. 6 in. and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 5 " 6 " 2 " "	39
6 " 6 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cement and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

BROWNSTONE.

[All quotations f. o. b. quarry, unless otherwise mentioned.]

	Cu. ft.	
Carbondale, light	70c.	f. o. b. quarry
" dark	95	" "
Hummelstown	45	" "
Lake Superior	100	" Chicago
Trenton	50	
Ohio	35	
Linden	80	

OHIO BROWNSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	60c
No. 2. " "	50

Stone ordered to dimension sizes 10 cents per cubic foot extra.

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT—

(Middlesex Quarry Co., Portland.)

	Cu. ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft. and over, price to be agreed upon.	

	Superficial
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft. long, promiscuous sizes	61
Platforms, Cornice, etc., 7 to 8 in. thick, under 18 superficial feet	85
Platform, Cornice, etc., 18 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	1 12
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashlar, under 4 in. thick	20
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 8 in. promiscuous lengths	63
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu. ft.	1 50
" " 20 cu. ft. and over, price to be agreed upon	

Monumental Stone, 8 to 12 in. thick, charged 12 in.

Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in. thick	38

Discount 5 per cent.; cash or approved Notes, at two months.

(Chas. W. Stearns, Cleveland, O.)

Brown stone	75c f. o. b. quarry.

FREESTONE.

New Brunswick brown	45c
Buena Vista	40
Ohio	30
Long meadow	60

GRANITE.

Westerly	
Monson	
Woodstock	300
Mica Stone	50
Port Deposit	40

GREEN STONE.

Pennsylvania	500

LIME, CEMENT, ETC.

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f. o. b. Erie.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs.	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	50
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " 1 " " " "	35
Fire brick Savage per 100	5 00
" " Aetna " "	4 00
" " Montezuma " "	3 50
" " West Virginia " "	3 00
Ground fire clay, best, per bushel	1 00
" " " common " "	75

Discounts

Vitrified sewer pipe	50 per cent.
Flue Pipe for Chimneys	25 " "
Terra Cotta Chimney Tops	25

LIMESTONE.

	Cu. ft.	
Salem, Bedford	25c	f. o. b. quarry.
Oolitic, " buff	25	" "
" " blue	35	" "
Oolitic Bowling Green	25	" "
Artesian	35	" "
Grafton	35	" "

MAGNESIAN—

(J. A. Green, Stone City Iowa.)

Dimension Stone—(First Quality of all ordinary sizes.)

12 inches and over, per cubic foot	$ 35
11 to 12 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17

Vault covers—(Large size.)

7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25

Flagging Stone—(Ordinary size.)

5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10

Bridge Stone.

Common, per cubic yard	$ 2 50
Copings, " " "	6 75
Pedestal Bases, per cubic yard	5 75

Footing Stone.

Dimensions, per cubic yard	$ 3 25
Common, " " "	2 50

Rubble or Building Stone.

Common Rubble, Per 100 lbs	2½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	6

Street Crossings

5 to 6 inches, per superficial foot	$ 15
Curbing, 6 to 8 inches thick, per superficial ft.	15

Cut and Rubbed Stone—(Finished. Ready to lay in their place.)

Ashlars per sq. ft. measuring all that shows	$ 60
Base	70

Corner Blocks

Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

JOLIET ....Rubble, $6 cord; dimension 30c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts. per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts extra per superficial foot.

Rough Stone.

Mill Blocks as quarried, per cu ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $10 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft.	15c
Promiscuous good select Bridge Stone, cu ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 2 per ct., on rough and dimension, and 5 per ct. on sawed.

(H. Dearborn & Son, Stone City, Iowa.)

Dimension Stone Drilled to Given Size.

	Per Lineal Foot, f. o. b.
Water Table, 11 and 12 inches thick	35c
" 9 " 10 " "	30
" 7 " 8 " "	28
" 6 " " "	25
Belt Course, 5 to 7 inches thick	25
Window Caps and Sills	25

Dimension Stone in Large Pieces.

12 inches thick and over, per cubic foot f. o. b.	35c
11 and 10 inches, per superficial foot f. o. b.	30
9 " 10 " " " "	27
7 " 7 " " " "	25
6 " " " "	20
5 " " " "	17
4 " " " "	12
3 " " " "	10
Rough Flags, promiscuous sizes, all shapes, per carload	25 00

Ashlar all Lengths.

11 and 12 inches thick, lineal	$ 25
9 " 10 " " "	20
7 " 8 " " "	17
Bridge Stone, per cubic yard	2 50
Footing " " " "	2 25
Dimension Footings per foot	15
Bridge Coping and Pedestal, per cubic foot,	25
Street Crossings and Curbs, per superficial foot	20
Block Rubble drilled, per 100 lbs.	5 Cents
Heavy Block Rubble, per 100 lbs	4 Cents
Select Rubble, per 100 lbs	3½ Cents
Common Rubble, per 100 lbs	2½ Cents
Riprap, per carload	1 50

Flagging Cut Ready to Lay Down.

7 and 8 inches thick, per superficial foot	35c
6 " " " " "	30
5 " " " " "	22
4 " " " " "	17
3 " " " " "	14

Cut Stone.

Window Caps and Sills, per lineal foot	$ 50
Window Caps and Sills, over one foot wide, per superficial foot	50
Water Table, 11 and 12 inches, per lineal foot	1 00
" " 9 " 10 " " " "	75
" " 7 " 8 " " " "	60
Door sills, platforms and steps, per superficial foot	60
Frieze Course, per superficial foot	60
Ashlar, per superficial foot	50
Corner Blocks, plain, per superficial foot	75
" " rustic " " "	85
Bases, per superficial foot	70
Circular and Segment Caps, outside measure, per lineal foot	75
Circular and Segment Caps, beveled and scotia, per lineal foot	1 00

[Big 4 Limestone Co., New Point, Ind.]

Prices on cars at quarry, the buyer paying freights.

Flagging for Sidewalks.

	In Rough.	Jointed.	Jointed and 4-cut Hammered.
3-inch	10c	13c	20c
4 "	16c	21c	26c
5 "	17c	22c	27c
6 "	18c	24c	30c
7 "	22c	28c	34c
8 "	24c	30c	36c
9 "	26c	33c	39c
10 "	28c	36c	42c
11 "	30c	38c	44c
12 "	32c	40c	45c

2c extra when over 14 feet long or in strips less than 2 feet broad.

Platforms

	In Rough	6-cut Face, 8-cut Edges.	8-cut Face, 10-cut Edges.
6-inch	22c	58c	65c
7 "	24c	58c	65c
8 "	28c	58c	65c
9 "	30c	58c	65c

Block Stone.

	Cu. ft.
12 inches thick or over	
Irregular sizes, 20a70 ft.	30c
Special sizes	33c
Bases	33c

Block stone less the 12 in. thick at Flagging Prices.

Bridge Stone.	Ton of 2,000 lbs.
First-class, dressed	$2 25
" undressed	1 30
Second-class	1 00
Coping, 12 in. thick and over	2 15

" less than 12 in. thick at flagging prices.

Building stone.	Ton of 2,000 lbs.
Riprap	$0 26
Ordinary Rubble	60
Range Rubble (select)	1 00
Scrap Flagging	1 50

Range stone 6 to 10 in. thick, 6 to 10 in. wide, 18c lin. ft.

Jail Stone.	6-cut Hammered.
6-inch, one side dressed	34c
both sides dressed	46c
7-inch, one side dressed	38c
both sides dressed	50
8-inch, one side dressed	42c
both sides dressed	54c
9-inche, one side dressed	46c
both sides dressed	58c

Door Sills and Steps

6-inch, per sup. foot in rough	Sq. ft.	20c
7 " " " "	"	25c
8 " " " "	"	30c
Ordinary dress. 6-cut edge, 4-cut face	Sup. ft.	50c
Extra dress, 8 cut edge, 6-cut face	"	58c
" " 10 " " 8 "	"	65c
Sawed sills of all kinds per sup. foot		

Strips less than 12 inches wide same price per lineal foot as Sills and Steps are per superficial foot.

Culvert Covering and Footings.

Same price as Footings.

Irregular sizes, ...6 to 9 in. thick, 11c   10 to 12 in. 12c
Dimension " ....8 to 9 in. thick, 13c   10 to 12 in. 14c

Crushed Stone.

In orders for 25 cars and over............35c per ton.
" of less than 25 cars............40c "

Invert Stone for Sewers.

9x20 in.x2 ft. radius............95c lineal foot.
9x20 in.x3 ft. " ....90c "

Pier Stone.

Stone in rough, 25c per cubic foot.

The thickness optional with consignor.

If dressed, add to price of stone in rough for bedding and pitching face, 18c per cubic foot. For bedding and tooth axing face, 26c per foot face measure.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	15
3 " " " "	12

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	22
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing.

10 to 12 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone,
$3 to $4.50............per cubic yard.

Rip-Rap
$1 to $2.50............per car load.

MARBLE.

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial In. ¾	1	1¼	1½	2	3	4	Monumental.
Dark Veined Blue	25	30	35	40	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	50	55	82	1 10	4 00
Ex. Dk. Veined Blue	35	40	50	60	60	90	1 20	4 50
Ex. Dk. Mottled Blue	40	45	55	70	70	1 05	1 40	5 00

Dark blue base strips and posts, per cubic foot	$1 75
Dark blue bottom bases............per cubic foot	1 75
Dark blue bottom bases defective, per cubic foot	1 25
Dark blue markers, 0.10 to 1.2 long, 4 in. thick each	50
Dark blue markers, 0.10 to 1,2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 6 in wide, assorted sizes each.	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra ....cubic foot	50
Strips ordered 7 0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing............per cubic foot.	35
Boxing............" "	25

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial 1 in.	1¼ in.	1½ in	2 in.	3 in.	4 in.	Cu. Monumental
Statuary	90	1 15	Same as 2 inch	1 35	2 00	2 70	8 50
No. 1	75	90		1 10	1 65	2 20	6 50
Average	60	70		75	1 12	1 50	5 25
No. 2	40	45		55	72	1 10	4 25
Rutland Italian	30	35		55	82	1 10	4 25
Mottled Smith				40	60	80	3 50
Best No. 3	27	32		35	52	70	3 00
No. 3	18	22		25	37	50	2 00
Extra dark and mottled blue	40	50		60	90	1 20	1 50
Dark blue	30	35		50	75	1 00	3 50
Light blue	20	25		30	45	60	2 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in Inches.	Diam. Bowl in Inches.	Rutland Average. S. F. D. M. V. Mount Dk. No. 1	R'tl'd No. 2 ex. dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No. 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue. Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	3 40
8	4	2 95	2 85	2 75	2 65	2 55	3 65
9	5	3 15	3 05	2 95	2 85	2 75	3 75
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 80	3 60	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	3 90	3 70	5 50
14	6	4 80	4 60	4 30	4 00	3 80	5 70
12	7	5 15	4 85	4 65	4 35	4 15	5 75
13	7	5 35	5 05	4 75	4 55	4 35	6 25
14	7	5 65	5 25	4 95	4 65	4 45	6 50
15	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 60	6 20	5 80	5 60	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 00	7 40	6 90	6 40	6 00	8 90
16	9	8 80	8 10	7 50	7 00	6 60	9 60
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 60	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 50
18	10	11 35	10 35	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 25	14 25
24	10	13 75	12 45	11 35	10 35	9 55	15 75
18	11	13 75	12 65	11 55	10 65	9 95	15 85
20	11	14 65	13 25	12 15	11 15	10 35	15 85
22	11	15 35	13 95	12 75	11 65	10 85	16 85
24	11	16 25	14 65	13 35	12 15	11 35	17 85
18	12	16 65	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 85	17 15
22	12	17 75	16 05	14 55	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 35	13 15	......
28	12	20 65	18 45	16 55	14 95	13 65	......
24	13	21 90	19 00	17 10	15 50	14 20	......
26	13	22 50	20 10	18 00	16 20	14 80	......
28	13	23 80	21 20	19 00	17 10	15 60	......
30	13	25 00	22 30	19 90	17 90	16 30	......
24	14	25 80	23 20	21 00	19 10	17 00	......
26	14	27 40	24 70	22 30	20 30	18 70	......
28	14	29 20	26 20	23 60	21 40	19 70	......
30	14	30 90	27 70	24 90	22 50	20 70	......
32	14	32 70	29 20	26 20	23 70	21 80	......

Hearths, 1 in., sawed edges, per sup. foot	$ 24
No. 3 Base strips and posts, cubic foot	1 90
Inferior No. 3 posts and strips "	1 65
" No. 3 bottom bases "	1 65
" No. blue posts, strips and bottom bases	0 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4 "	1 00
Footstones, 5 to 8 in., each	30
" sawed heads, each	32
" " sand rub and box	38

SUTHERLAND FALLS MARBLE—

1888	Superficial.						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental.
Mourning veins	53	66	87	92	1 38	1 84	5 40
No. 1	48	59	82	87	1 30	1 74	4 90
Average	38	48	64	67	1 05	1 54	3 90
No 2	29	34	42	47	72	94	3 15
Best No 3	23	29	35	37	55	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Stripe and Posts, per cubic ft	$1 90
Inferior No. 3, Posts and Strips, per cubic foot	1 65
Inferior No. 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 12 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 2 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup. ft	24

MOUNTAIN DARK MARBLE—

1888	Superficial.					Cu.
	¾ in.	1¼ in.	2 in.	3 in.	4 in.	Monumental.
No 1	53	74	1 07	1 60	2 14	4 90
Average	48	64	87	1 30	1 74	4 90
No 2	30	49	67	1 00	1 34	3 90
No 3	25	34	50	78	1 04	2 90

Inferior No. 3, Bottom Bases, per cu. ft	$2 15
Inferior No 3, Strips and Posts, per cu. ft	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " small lots,		12
Sponges	per lb.	75
Red Grit	"	06
Nova Scotia Blue Grit	"	05
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

ITALIAN MARBLE— Cu. ft.

Monumental stock	$1 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size	Cut to size.
¾ in. slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubic foot.

Branches of Vermont Marble Co. see price list.

Toledo	40c.
Cleveland	35
Boston	50
Philadelphia	45
Detroit	40
Chicago	50
St. Louis	60

Cu. ft.

Tennessee Red	$2 50@$3 30	f. o. b.	Chicago
" Knoxville	3 00	"	"
Vermont White	3 50@ 6 00	"	"
Ophite	4 50@ 5 00	"	"
Armolite	1 50	"	"

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 2 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 24 000 pounds or more in one order.

GEORGIA MARBLE

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	Cubic foot. At Cincinnati
Kennesaw, selected	$6 50	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 60	2 95
Cherokee, selected	3 25	3 60
Cherokee average	2 75	3 10
No. 3 base Strips and Posts	1 50	1 95
Inferior No. 3 Posts and stripe	1 25	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	85
Markers, 16 to 18 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	25
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	25	35
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	60
Strips ordered, 9 feet long or over, extra	50	60

Urn list, sent on application.

(Columbian Marble Company.)

SAWED MARBLE —

Columbian Dark.

	per cu. ft.
Extra dark variegated	$5 00
No. 1. dark variegated	4 50
No. 1 dark mottled	4 50
No. 2 dark	3 50
Pearl blue	3 50
Inferior dark bases and strips	1 75

Columbian light.

Light medium Cloud	$4 50
Best light cloud	3 50
No. 2 light cloud	2 50
No. 3 light cloud	2 00
Inferior light	1 25

	Per superficial foot. 1 in.	1¼ in.	1½ in.
Extra dark variegated	50	62	80
No. 1 dark variegated	40	55	75
No 1 dark mottled	40	55	75
Pearl blue	36	45	65
Light medium cloud	40	55	75
Best light cloud	30	45	56
No. 2 light	23	30	35
No. 3 light	18	22	25
Hearth, sawed edges	20	—	—

Sawed marble.

	each.
Footstones, 5 to 8 inches	$ .20
Footstones, 5 to 8 inches, sawed heads	.32
Footstones, 5 to 8 inches, sawed heads, sanded and boxed	.25
Footstones, 5 to 8 inches, oval heads	.28

Extra charges.

	per cu. ft.
Diminished dies	$ 40
Strips and posts, 7 feet and over	50
Sand rubbing	.35
Boxing	25

All monumental stock will be boxed, with the exception of base strips and posts, unless otherwise ordered.

Building marble, tile and curbing. Prices given on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

	cu. ft.
Extra dark veined	$1 60
Dark blue	3 60

TOOLS—

¼ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in	per lb.	33
Frosting Tools	per doz.	3 00
⅜ in. Granite Lettering Tools	"	2 50
½ " " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mash "	" $2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	2 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb	each,	$ 60
3 to 5 lb	"	75
5 to 7 lb	"	1 25
8 lb. and up	"	1 50

[J. H. Knipproberg, Cleveland, O.]

Stone Cutters Mallets $12 00 Doz.

Wooden Rolls for stones 3 feet long	4	5	6	7	8 in.
	25c	35c	50c	65c	75c each

SPECIALS—

Diminished Dies, extra......per cubic foot	50c
Stripe ordered 7 ft. long and over, extra per cubic foot	50
Sawing edges slabs, 1 inch thick per superficial ft	03
" " " 2 " " "	05
" " " 3 " " "	08
" " " 4 " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above

SAND RUBBING—

Monumental Stock ....per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths........per surface foot rubbed	05

MACHINERY.

STEAM PUMPS— Discount

Smedley's 25 per ct.

PULVERIZERS— Discount

Cyclone 20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete $100

EXCAVATORS—

Little Giant	$1,600
Railroad Giant	6,500

CRAB WINCHES.

[Phenix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting. Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	6 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in	$20 00
No. 2	" 20	25 00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$50 00
" 0	" " " " with "	54 00
" 1	" 21x27, " 10 with hood	40 00

Discount 30 per cent

[Star Machine Co., Buffalo, N. Y.]

No. 5,	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Iron	33⅓
Steel	37½
Gal. Iron	33⅓

(Washburn & Moen M'f'g. Co.)

Iron	33⅓
Steel	37½
Gal. Iron	33⅓

BLOCKS AND TACKLE—

(Toledo Block Works.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron-bushed	2 40	4 50	6 20
10 " "	3 20	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	6 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	23 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 25	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	33 00	46 00
20 " "	25 00	45 00	60 00

Wrought-iron Tackle Blocks	Single	Double	Triple
6 inch	1 40	2 25	2 75
9 "	2 40	3 50	4 50
12 "	4 55	8 10	10 40
16 "	9 55	15 70	22 00
20 "	22 00	33 40	50 00

Iron-bushed, discount 20 per cent.; roller-bushed discount 10 per cent

(Detroit Block Works.)

Discount from list 40 per ct.

WROUGHT-IRON PIPE—

(American Tube & Iron Co.)

	Discount
Butt weld. black	55 per ct.
" " galv	45 "
Lap " black	65 "
" " galv	55 "

BELTING-RUBBER.—

Standard	60 per ct. and 10 per ct.
X quality	50 " " 10 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	20 00
Best bundle stone	33 00

RED SANDSTONE.

(All quotations f. o. b. quarry, except otherwise mentioned.)

	Cu. ft.
Portage	60c
Dunreith	50c
Darlington	40
McArthur	45
Carlisle	65
Potomac	50

SLATE.

ROOFING SLATE—

[Henry Fulmer, Easton, Pa.]

F. O. B. Slatington, Pa.

Size.	No. in sq		Size.	No. in sq	
14x24	98	$3 50	10x18	192	$3 75
13x24	106		9x18	214	
12x24	115		10x16	232	
12x22	127		9x16	247	
11x22	139		8x16	277	
11x20	153		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	20

Mantel stock as it runs through 15 cents square foot in car lots.

[Coolman & Westcott Fairhaven Vt.]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17

For rubbing both faces of above, excepting caps and trusses extra	.02
Any of the above unrubbed less	.01
Steps, to 5 ft. in length	.20
Steps, 5 ft. to 8 ft., "	.25
Steps larger	special
Platforms to 16 sup. ft	.20
" 16 to 22 " "	.25
" 22 to 28 " "	.30
" Larger	special

Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	.22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	.22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tubs complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscoting, sup. ft.	.20
Black Boards, ¼ to ⅜ up to 3 ft. wide, crated sup. ft.	.18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft	.20
Black Boards, 3½ ft. to 4 ft. wide crated, " "	.22
Thresholds to 5 ft. in length " "	.20
" 5 ft. to 8 ft. " " "	.25
Curriers' Slabs, faced one side crated, " "	.30
Curriers' Slabs, faced two sides, crated, " "	.34
Billiard Table Beds, crated, " "	.22
Imposing Stones, " "	.30
Grave Covers, sawn and planed only, and in two or more pieces. " "	.16
Grave Boxes, rabbeted ends, " "	.20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	.16
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	.20
16 to 22 " "	.25
22 to 28 " "	.30

Vermont Red	$13 50	f. o. b. Chicago.
" Purple	5 60	" "
" Green	5 50	" "

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x15, 16x20	2 65	"
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 11x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 75	" "
Maine	5 50@5 80	" "

BLACK—

(Michigan Slate Co., Lansing.)

Michigan	$5 50	f. o. b. quarry

PURPLE ROOFING SLATE —

(Hazard Slate Company Fair Haven, Vt.)

	First.	Second
24x12	$3 75	$2 25
22x14	3 75	2 25
22x12	3 50	2 25
22x14	3 85	2 25
20x12	3 85	2 25
20x10	3 85	2 25
18x12	3 50	2 25
18x10	3 50	2 25
18x 9	3 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	3 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	2 75	2 25
14x 9	2 75	2 25
14x 8	2 75	2 25
12x10	2 50	2 25
12x 9	2 50	2 25
12x 8	2 50	2 25

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—	Cu. ft.
No. 1 Promiscuous block	.50c
No 2 " "	.40

BEREA AND BLUE AMHERST—	
No. 1 Promiscuous Blocks	.40c
No. 2 " "	.30
No. 1 Monument Bases, broken to size	.45
No. 2 " " " "	.35
Pier Blocks " "	.20

SPLIT FLAGGING—	Sq. ft.
3 inches thick, 6 feet long and under	.07c
4 " " 6 " "	.09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—	Sq. ft.
3 in. Buff Amherst	.25c
6 " " "	.46
9 " " "	.68
12 " " "	.88
3 in. Berea or Blue Amherst	.21
6 " " "	.41
12 " " "	.77

BEREA AND BLUE AMHERST SAWED FLAGGING—	
2 inches thick	.10
2½ " "	.12
3 " "	.14
4 " "	.18

SPLIT PLATFORMS—

	Superficial feet. 5in.	12 in.
No. 1 Buff Amherst	.25c	60c
No 2 " "	.20c	50
No. 1 Berea or Blue Amherst,	.20c	50
No 2 " " "	.17c	40
No. 3 " " " (for sidewalks)	.12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—	Cu. ft.
Promiscuous Blocks	.15c

Discount 35 per cent.

Write for discounts, etc.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—	Cu. ft.
No. 1	.30c
No. 2	.25

(French Fort Quarry, New Castle, N. B.)

Olive	40c f. o. b.

(Babbitt Sandstone Co., Ypsilanti, Mich.)

Brown Sandstone	.25 f. o. b. quarry

(Lake Huron Stone Co., Detroit, Mich.)

Blue Sandstone	.30c f. o. b.

TOOLS.

SHOVELS—

(Sandford, Fork & Tool Co., Terre Haute, Ind.)

20 per cent. discount 2 per cent. cash

REAMERS—

(Knox Rock Blasting Co., Pittsburgh, Pa.)

	each
3 feet long	$3 00
6 "	5 00
9 "	6 50
12 "	8 00

TOOL STEEL—

(F. C. Brookebank, Cleveland, O.)

Jackson's	.16c per lb.

JULY 20, 1888.

SEALED PROPOSALS will be received at the Office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 29th day of Aug., 1888, for the labor and materials required in the erection and completion of the U. S. Post-office etc., building at SPRINGFIELD, MASS., (except the heating apparatus) in accordance with the specification and drawings, copies of which may be seen at this Office, the Office of the Superintendent, the Master Builders' Exchange, at Albany, N. Y., the Masters Builders' Association, Boston, Mass., Builders' Exchanges, Lynn, Mass., and Baltimore, Md., the Mechanics' and Traders' Exchange, New York, the Mechanics' Exchanges at Providence, R. I., and Worcester, Mass.

Each bid must be accompanied by a certified check for $500.00.

Upon receipt at the Office of the Supervising Architect, Treasury Department, of a Post office money order in amount five dollars, payable to the Treasurer of the United States parties will be furnished with copies of specification and plans.

WILL. A. FRERET.
Supervising Architect.

JULY 21, 1888.

SEALED PROPOSALS will be received at the Office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 P. M., on the 29th day of August, 1888, for the labor and materials required in the completion of the approaches for the U. S. Court House and Postoffice Building at SAN ANTONIO, TEX. In accordance with the specification and drawings, copies of which may be seen at this Office, at the office of the Superintendent Builders' Exchanges at Baltimore, Md., and Charleston, S. C., the Builders' and Traders' Exchanges, Louisville, Ky., and Kansas City, Mo., the office of the Superintendent, Dallas, Tex., and the Mechanics, Dealers and Lumbermen's Exchange, New Orleans, La.

Each bid must be accompanied by a certified check for $300.

Upon receipt at the Office of the Supervising Architect, Treasury Department, of a post office money order in amount two dollars, payable to the Treasurer of the United States parties will be furnished with copies of specification and plans.

WILL. A. FRERET,
Supervising Architect.

JULY 23, 1888.

SEALED PROPOSALS will be received at the Office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M. on the 24th day of Aug., 1888, for the labor and material required in the erection and completion of the extension of U. S. Court House and Postoffice building at JERSEY City N. J., in accordance with the specification and drawings, copies of which may be seen at this Office, the office of the Superintendent, the Builders' Exchange, Baltimore, Md., the Builders' Exchange, Newark, N. J. the Mechanics' and Traders' Exchange, New York City, and the Master Builders' Exchange, Philadelphia, Pa.

Each bid must be accompanied by a certified check for $300.

Upon receipt at this Office of of a postoffice money order in amount two dollars, payable to the Treasurer of the United States parties will be furnished with copies of the drawing and specifications

WILL. A. FRERET,
Supervising Architect.

JULY 26, 1888.

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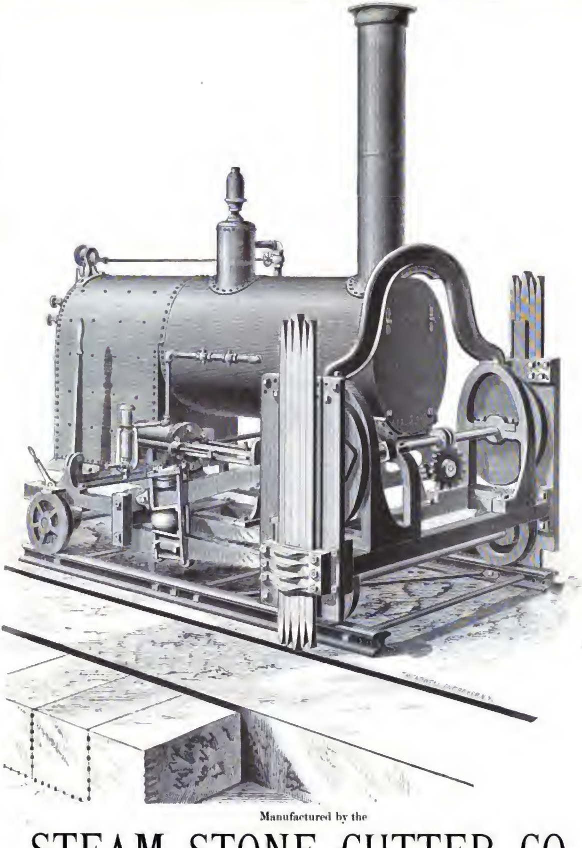

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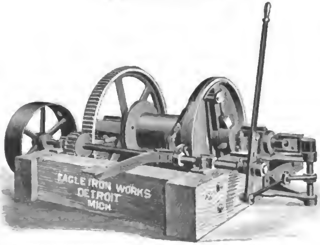

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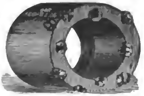

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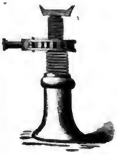

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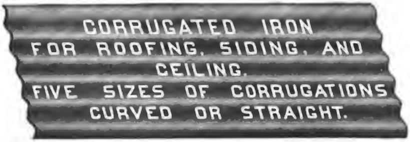

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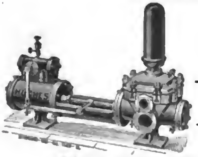

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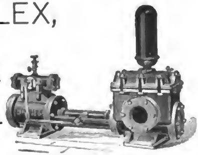

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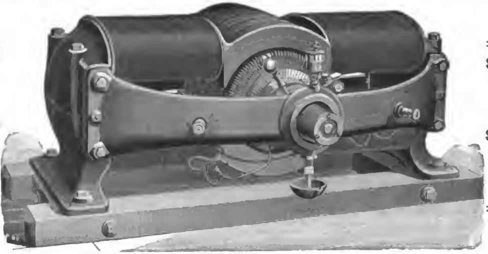

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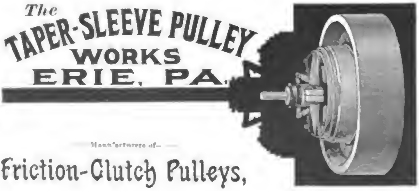

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STONE.

VOL. I. INDIANAPOLIS, IND., SEPTEMBER, 1888. NO. V.

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

PUBLISHED MONTHLY BY

THE D. H. RANCK PUBLISHING CO.

(INCORPORATED.)

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L. H. GIBSON, - - - - - - - Editor.

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It is unsafe to transmit currency or postal notes in the mails as at present managed. We desire our patrons to take notice of this, and *not risk the loss of heir remittances* to us. We have lost many valuable letters during the past three years, and we have failed to recover a single one, though we have tried every means to do so. Whether Democrats or Republicans are responsible for this unfortunate condition of the postal service is no concern to us. *We know it is wofully inefficient*—if anything worse now than it was two years ago—and there is no near prospect of improvement. *In sending us money, purchase a money order, express order, or registered letter, or New York or Chicago bank draft.*

THE *Clay-Worker* objects to what we have to say about terra cotta. That journal goes to workers in its own field, and likewise STONE to those interested with us. A controversy would not be profitable or satisfactory under any circumstances. In order to present the case to all interested we would have to republish all that *The Clay-Worker* had to say on its side, and that journal, in the same spirit, would have to reproduce our words. This would not be satisfactory. The writer is familiar with the use and history of terra cotta; he is acquainted with its prominent use throughout the United States; has had not a little to do with its use in this state, and believes that he understands its value as a building material. We did not institute a comparison between terra cotta and stone. We said that within the last year or two there had been a decline in the amount of this material. Possibly we would have made our point clearer had we stated that many of the architects who have been most prominent in its use in the larger cities have had occasion to use it more sparingly during more recent years. A knowledge of their practice justifies us in this statement. The makers of terra cotta are measurably responsible for this result. They have urged its use in locations not suited to this material; have allowed it to be set badly; have formed it carelessly, and altogether have done not a little to injure a building material which has a legitimate but not a universal field in building construction. A visit to New York, Boston, Albany, Buffalo, Cleveland, Chicago, St. Louis, Minneapolis, St. Paul, or other of the older cities, will justify our statement that terra cotta is not received with the same favor that it was a year or two ago. It is plain to see that a larger proportion of stone is being used and that terra cotta has suffered. One reason for this is that terra cotta was recommended for use in locations where it had no place. As a result there has been somewhat of a reaction against it. Again, it has been recommended in the past on account of its extreme cheapness. Where a large amount of highly ornamental work is to be produced terra cotta is cheaper than stone. It is the practice, however, of those interested in the manufacture of terra cotta to urge that work be made ornamental in order to make more successful competition against stone possible. Still another reason which is against the use of terra cotta is the large number of exposed vertical joints required. Even where the greatest care is exercised water will work down between these joints and in the case of freezing weather do serious damage. This risk is much greater in the case of terra cotta than stone.

Contrary to the implication of *The Clay-Worker* it is not our desire to undertake to advance the interests of stone by assailing other interests. We merely stated what we believed to be a fact and can see no reason why our motives should be questioned.

"WHY did you not go to the convention at Cleveland?" was asked of an absentee.

"Well, I'll tell you," said he. "We have been trying to do just what they want to do for a good many years and there is always some fellow steps in about at the wrong time and spoils it all. We get pretty near there and then it is knocked out. I feel that this convention business is no good."

"You are mistaken there," we said. "The Cleveland meeting was one big step to success. The marble and granite dealers have a good deal to learn about running a convention and organizing to restrain competition, but they are moving in the right direction, and they will arrive."

We believe this to be true. There are a great many people who are at once disturbed and discontented because an organization is not at once successful in doing all that is intended of it. One positive failure is enough to disconcert several members and cause ruptures in the organization. This is not as it should be. The business of organizing for the purpose of restraining competition, and correcting other evils of the trade, is one involving more or less complication. There are a great many interests to be harmonized. It cannot be done at once. It is a work in which all have to be trained together. At first there is a period almost kindergarten in its character. The advance is more rapid in respect to time involved, and if patience and good sense are exercised the desired end will soon be reached. The trouble is that so many come to a meeting of this kind with a plan. They have a scheme of their own. They are prepared to say that as soon as it is adopted the day of salvation is at hand. Because the plan of each is not received at once there is a certain amount of discontent. This, however, is only one detail which makes convention work one of difficulty. All these things have to be harmonized. It takes good sense, patience and time. District organization is a great educator, looking to successful state and national organizations. The marble and granite dealers of a city or county, or two or three counties, may come together and organize for local protection from one another; they derive a common knowledge of one another's troubles and in the end become measurably sympathetic and successful. After a certain amount of experience of this kind in local work they are ripe to become members of successful state and national organizations. It is only through the means of district organizations of this kind that pronounced success is possible in a business where the interests are so diversified as that of the marble and granite dealers. It must be borne in mind that the business of organizing in this form is new to the majority, and that the work leading to the successful accomplishment of the end desired must, for a time, be of an educational character. It is preposterous to expect anything different. The work of organization is as complicated as many other details which pertain to the marble and granite business. As none of these can be learned in a very short time, it is not to be expected that there would be an exception in the organization experience.

QUARRY METHODS.

THE use of explosives in quarries is constantly on the decrease. When cheapness is the only consideration, as when the stone is to be used for rubble, cellar walls and ordinary foundation work, blasting is universally employed. In limestone regions the debris from blasting is burned for lime and the waste is little. But where stone is to be used for the best building purposes the work is done by channeling and wedging. Although this is more expensive than blasting as far as the general cost of the work is concerned, the better condition in which the stone is raised more than compensates for the greater first cost. Stone which has been quarried by blasting almost always shows defects caused by the shock. These defects may not be evident at the time the stone is put into the building, but develope as cracks after it has been in use for a time. Many such cracks are supposed to be the effect of weathering when in reality they are caused by the powder used in quarrying. The marble of Carrara, which is quarried by blasting, and then hurled many feet down the mountains, is most seriously affected by the rough treatment accorded it. Much of it is found unfit for use before it leaves the quarries, and much more that is shipped shows defects upon being worked or after being placed in position.

"Mr. Edwin Greble, a marble dealer, of Philadelphia, says that when he visited the Carrara marble quarries the scene reminded him of the bombardment of a fort; that he has examined blocks of marble in some of the old ruins of Rome, and found that the stone was somewhat worn but not cracked, but that scarcely a block of marble quarried since the introduction of gunpowder can be found free from cracks."

It is this condition of Carrara marble which gives our marble a superiority in point of strength. Should they quarry the former by improved methods it would prove a more serious rival than now for building purposes.

The present methods of quarrying in most places are by using channeling machines and wedges. There are various machines which are extensixely used. Each of these machines has its particular merit for different kinds of work and more than one kind of them are sometimes used in the same quarry in different portions of the work. In marble these machines taken together are capable of doing all kinds of channeling required. The one machine may be for vertical work as being considered the most economical, but for oblique cutting another machine may be used. It may be capable of cutting channels at any line or inclination. There are machines which, detached from the boilers, can cut under a vertical wall. When the dip of the strata is less than 50 degrees the advantages of a horizontal quarry floor are sufficient to compensate for the waste. Where the dip is less than 45 to 50 degrees the channels are cut perpendicular to the plane of stratification and the blocks come out rectangular in shape. It is only comparatively recent that the channeling machine has been used to quarry sandstone. The cutting bars for use in such quarried are made sharpened at both ends so that when one becomes dull the other may be used. The cutting bars need to be sharpened very frequently for this work. The work of channeling sandstone with pick and shovel is very injurious to the workmen on account of the dust inhaled into the lungs.

After the channeling is accomplished it is necessary to under-cut the rock in order to raise it. This is done by drilling a series of holes along the bottom and then loosening the block by means of wedges. The work of drilling the holes is called "gadding" and is done with a "gadding machine" which uses the diamond drill. After the holes are drilled the split is made with the common plug-and-feather wedges.

Almost every quarry has some peculiar method of its own for loosening the stone, depending upon the kind of stone worked, the dip of the strata as well as other minor details. Granite is quarried more extensively by blasting than other rocks. Other methods are very expensive on account of the hardness of the rock and lack of cleavage joints. For these very reasons granite suffers less from the use of explosives. Still in many quarries channelers are used.

CRUSHING RESISTANCE OF STONE.

Prof. W. C. Unwin, in a paper on the above subject, presented at the recent meeting of the British Association, remarked that 20 years ago it was common in experiments on crushing to bed the test specimens of rigid materials like stone on lead plates, with an idea of securing uniform distribution of pressure on the faces at which the crushing pressure is applied. Professor Unwin has long had the opinion that to support blocks for crushing on a plastic support is wrong in principle. Hence, in experiments on the crushing of stone, and of Portland cement and concrete, he has adopted the plan of preparing the faces on which the crushing pressure acts with a thin layer of plaster. This can easily be worked to smooth and parallel surfaces, used to receive the iron plates of the crushing shackles directly if necessary; but he generally interposes a sheet of mill-board, which is a very hard and only slightly compressible material. It seemed desirable to try what was the difference of the crushing strength of blocks supported in these two ways. Two series of 4-inch cubes of Portland stone and Yorkshire grit were obtained of very uniform quality. Results of tests which were given showed a very great reduction of strength, which occurs when a thin plate of plastic material, like lead, is used on the faces to which the crushing pressure is applied. The crushing pressure of blocks between lead plates was, in one case, only three-fifths, and in another only three-sevenths of that of blocks prepared with plaster and crushed between mill-boards. One block was cemented carefully between two rigid iron plates with parallel surfaces, and this carried a little more, but only a little more load than the block prepared with plaster and crushed between loose mill boards. An examination of the mode of fracture of the blocks showed why the lead has so dangerous an effect on the strength. The blocks crushed between mill-boards sheared approximately at 45 degrees in the way well understood, forming regular pyramids; but the blocks crushed between lead broke up into a number of vertical prisms with nearly vertical faces. The lead flowing under the crushing pressure produced by friction a tension in the block at right angles to the crushing pressure, tearing the block in pieces and completely altering the angle of fracture. The pressure of fluidity of lead is known to be from 1½ to 3 tons per square inch, and these pressures were exceeded in the crushing experiments. The result seems important, because it is a still common practice to use lead, or deal, or some other plastic or compressible material in crushing experiments, and it is not generally known that this has the effect of diminishing the crushing resistance.

The Georgia Marble Co., of Atlanta, has just completed a 24-gang marble saw mill, with all latest improvements, including Ripley's saw-feed, Brown's 250 horse power engine, and a battery of three 100 horse power compound tubular boilers. They now saw blocks 20 feet long, or 8 feet wide. The company is now running 40 gangs of saws. Their orders are increasing so rapidly that they are more than ninety days behind in production. They received a few days ago one order for full 150 broad gauge car loads of sawed marble. They think everything looks exceedingly promising for the future of Georgia marble.

BUILDING CASUALTIES.

THE following is from *The Architect*, the well-known British architectural journal:

> A bill has been introduced by Mr. Broadhurst to provide specially for the regulation and inspection of slate-quarries and other quarries in which persons work in getting stone, coprolities, or other minerals, clay and brick-earth excepted. It is proposed that the Factory Acts shall not apply to these places; but that the regulations shall be as follows:—The employment of a boy or girl under the age of ten is forbidden altogether. The longest time of employment permitted for a boy or girl under the age of sixteen or a woman in a week is fifty-four hours, and in a day ten hours. And no employment is allowed between nine at night and five in the morning, or at all on Sunday, or after two o'clock on Saturday afternoon. Intervals of meals are directed to be allowed to each boy, girl and woman, amounting in the whole to not less than half an hour during each period of employment which exceeds five hours, and to not less than one hour and a half during each period of employment which exceeds eight hours. For a contravention of these provisions both owner and agent are to be liable to punishment unless they show they took all reasonable means to prevent it. And in case a parent or guardian misrepresents the age of a boy or girl, he will be responsible instead. The inspection of quarries is provided for. When an inspector finds anything dangerous or defective, so as, in his opinion, to threaten or tend to the bodily injury of anyone, he may require it to be remedied. If the owner objects, the matter is to be placed before the home secretary, who will refer it to arbitration. The bill requires the owner of a slate quarry, or of a quarry in which ironstone or fuller's earth is gotten, to send returns every year to the inspector as to the quantity of mineral treated, the average percentage when known of any metal contained in it, and the average number of persons ordinarily employed. And other quarries may at any time be included by the home secretary in this regulation. The bill also contains various requirements as to notice, etc., in case of any accident occurring in a quarry. Moreover, abandoned quarries are to be fenced in; but where the abandonment has already taken place, this provision is limited to certain cases only.

Where an accident occurs which causes injury or loss of life, the matter is reported to the home secretary, a national official, who appoints competent investigators to look into and report all facts. If it appears that the law has been violated, those responsible are made to suffer. This is as it should be. In new countries, those which are in course of development, where everyone is struggling ty hold a financial footing, it is not common to enforce ordinary regulations looking to the care and protection of those employed. Everyone takes his own risk. In respect to the risk taken the employes in quarries in this country are surrounded by the pioneer conditions. There are no recognized inspectors of quarries and quarrying machinery so far as we know. While the owners do not desire to cause loss of life or injury to those employed in and about the quarries, it is clear enough that proper precautions are not taken in this matter any more than in the construction of buildings. It is difficult to realize the importance of a matter of this kind. The loss of a hand, an arm, or a leg, or other bodily injury which affects the earning capacity of a laborer or workman is a matter so serious that few comprehend it. The less the man's wages, the lower his position, the more serious is this matter. He has possibly a dollar and a half a day between him and want. If he suffers any of the injuries such as we have mentioned that margin is removed. Usually he is a married man. Then there are the children and his wife, who suffer with him. There is the mental anguish and the physical loss and suffering. To the man who has capital to fall back on, or one who works entirely with his head, an injury of this kind means very little. It is not liable to happen. Injury by accidents to those engaged in mechanical occupations is too serious a matter to be allowed to rest in its present state of neglect. Foreign travelers look upon our carelessness in this respect as barbarous. We went into a mill with an English gentleman some time ago, and he appeared horrified at what he saw—gearing, pulleys, belts and other moving parts of the mill unprotected on every hand! Americans as a rule do not think of the necessity of protection. Yet the danger is great, and injuries not infrequent. Said he: "This mill would not be allowed to run an hour in Great Britain, it should not be allowed to run an hour here. Many of these men have, or should have, families dependent upon them; their wives and children are in peril to say nothing of the men themselves. This is too serious a matter for such criminal neglect."

It was only a few days ago that we witnessed an accident in this city. It was a clear case of carelessness or incompetency of the party in charge of the work. An injured laborer was struck by a stone weighing ten to twelve tons. What was the result? The man was dragged out of the hole and carried off to the hospital. He did not even get a three-line notice in the newspaper. It may be asked "What should be done in a case of this kind?" A law should be so framed as to make it obligatory on the part of the contractor, or party in charge of the work, to at once report the matter to the proper public authorities. It should be required of him that nothing in or about that part of the premises in which the accident happened, or anything in connection with it, should be moved excepting in so far as it was necessary for the welfare of the injured party or the safety of others in or about the premises, until the authorities had carefully inspected the cause of the accident. The effect of the investigation and all would be to locate the responsibility. If a man is killed, there is an investigation by coroner's jury, but there are other tragedies as the result of accidents which do not kill which are more serious in affecting the welfare of those dependent upon the injured one than loss of life. A poor woman with little children around her is oftentimes encumbered with an injured husband, whose incapacity renders him quite as much a burden as one of her children. Investigation which locates responsibility will make those in charge of work more careful. Not only that they will study the means of preventing accidents. All of the machinery used in whatever line of manufacture, or that used in any branch of mechanics, and other means used in these pursuits, should be subject to constant inspection. There is only horror over the loss of life. There is great carelessness over loss by accident which does not kill. This is not as it should be.

STONE IN FLORIDA.

There are few stone quarries in Florida, and those which are known are not operated to any great extent, the demand for stone being very limited. Lumber is very cheap there, and is preferred to stone. There has been opened within a few years a quarry at Hawthorne, the stone of which is said to consist almost entirely of silica, and is of a quality for glass-making. The stone is very soft when taken out, but hardens on exposure to the sun and air. Chimneys of this material which have been built thirty years are still in a good state of preservation. It is sold at the quarry for 28 cents per cubic foot; it is taken out with a hand saw, two men being able to cut 1,500 bricks of a size 4 by 8 by 16 inches in a day.

About two miles from St. Augustine is a quarry which must have been open at least two hundred years, as there are now standing in that city parts of buildings of this material which are fully of that age. The stone is the orbitoides limestone. It is often simply a mass of shells. There is in the National Museum a piece which must have been quarried a century ago, which when compared with stone taken out recently shows that the weather has produced no change. It is not probable that this stone would last in the severe Northern climate as it does in that of Florida. The rock in the quarry lies very near the surface, none of the excavations being more than six or eight feet deep. The stone can be cut with an ax, and is taken out in the sizes and shapes required.

GOTHIC DETAILS.

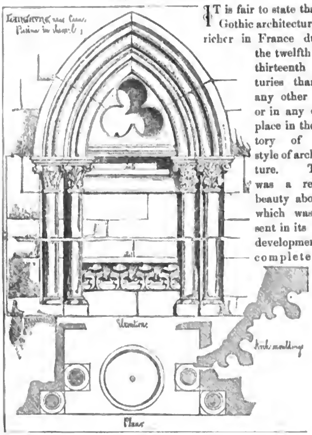


FIG. 1.

IT is fair to state that the Gothic architecture was richer in France during the twelfth and thirteenth centuries than at any other time or in any other place in the history of that style of architecture. There was a refined beauty about it which was absent in its early development, a completeness and a finish which were corrupted during its later period. There was a warmth and a richness belonging to the Southern Gothic which was measureably absent from that of the North. There was more positive beauty, and not less that was massive, rich and intelligent. We are saying nothing to the disparagement of the English Gothic, especially of the early English, when we say that there are traces of a certain coldness running through it. There was a hardness which did not belong to the softer, more voluptuous architecture of the Southern countries. The English Gothic had beauties of its own. Mr. Burgess, a modern English Gothic architect, who designed Trinity College in this country, among other works of importance, took up the modern Gothic-English architecture in a spirit which resembled the Southern architecture. It had that roundness and fullness, a beauty of detail, a soft refinement which distinctly marked it as being something different from the architecture made conspicuous by Sir Gilbert Scott and George Edmund Street, the architect of the New English Law Courts. In point of design the work of Mr. Burgess as submitted for these buildings was certainly superior to the one selected. There were probably other reasons which warranted the selection of Mr. Street's design.

Herewith we submit designs selected from the various details of French Gothic work. The capitals Figs. 2 and 3 from Laon Cathedral are beautiful indeed, and in violent contrast with some of the modern efforts toward Gothic capitals. It often happens that a Gothic cap is used in the design for a monument, yet how seldom do we find anything that is carefully studied in detail in the matter of design, to say nothing of the execution. Yet it is hardly to be expected that a poor design would be well executed. In monumental design everything is too hasty in its conception and execution to expect the best of results. The demand of the times will be for something different, and we may be led to expect most satisfactory results.

The architecture of our buildings is superior in point of design to that of our best monuments. The reason is simple enough. The best designers, those most talented, have directed their attention where there was the most money. They did not find it in the direction of monumental work. The public is making a call for something different, and in doing so they express a desire to pay for what they want. This will bring the result.

Fig. 1 is from Langrune, and it is an example which may be useful in many ways to a monumental designer. All are most beautiful examples, and we hope that any one having occasion to use anything of this kind will have the good judgment to intilligently copy these details. Gothic architecture was never in a better state than at the time this work was done. For this reason we commend the study of these details to those interested in any branch of stone-cutting or stone-carving. We can only repeat what we have said before in the matter of the selection of well-known examples. There is first, the general knowledge that they are beautiful, and then the satisfaction that they have had the stamp of time to indicate and sustain their merit.

QUARRYING STATISTICS.

From advance sheets of the Government "Report of the Mineral Resources of the United States for 1887" we gather the following statistics of production:

Building stone.—Direct returns from producers show a total value of $25,000,000. This marked increase shows that the statement of 1886 was too small.

Brick and tile.—Value, $40,000,000. This represents an increase of about 13 per cent. in the production of brick and a decrease in tile, owing to the drouth in 1887 in Indiana and Ohio. Prices were slightly lower.

Lime.—The production is estimated at 46,750,000 barrels, with an average value of 50 cents per barrel.

Cement.—The production of cement from natural rock was 6,692,744 barrels, valued at 77½ cents per barrel, making $5,186,877 as the value of the year's product.

Buhr stones.—The value of the total product is estimated at $200,000.

Grindstones.—In Ohio and Michigan 37,400 tons were produced, valued at $224,400.

Corundum.—Total production from North Carolina and Georgia 600 short tons, with a spot value of $108,000.

Precious stones.—The value of American gems in rough state amounted to $88,600, besides gold quartz for specimens and gems, valued at $75,000.

Feldspar.—The amount consumed, principally by potters, was 10,200 long tons, valued at $56,100 before grinding. This includes freight to the principal markets, Trenton or New York. The consumption in 1886 was about 5,000 tons less than the production returned by quarrymen.

Flint.—For pottery 19,800 tons were used. Including the use for sand-paper and in glass manufacture, the total consumption was about 32,000 tons, worth, unground, $185,000.

Limestone.—Used as flux in the manufacture of pig iron in 1887, about 5,377,000 long tons; value at quarry, about $3,226,200.

Landlord—"I've called to tell you Bridget, that I am going to raise your rent."

Bridget—"Glad to hear it, sor. Faith, I can't raise it myself."
—*Texas Siftings.*

MICHIGAN MARBLE.

C. E. WRIGHT, C. E.

NORTHEAST of Ishpeming, about three and one-half miles, is a series of ridges composed of serpentine, marble, magnesian schists, greenstones and quartzite, which have nearly an east and west trend. The ridges of serpentine and marble have been traced for three or four miles, and the former is, no doubt, the equivalent of that at Presque Isle, some fifteen miles to the easterly.

I made a hasty examination of the locality. The points visited were within the south half of the northwest quarter of section 29, T. 48, R. 27. Proceeding at once to the west side of the section, I found there a sharp ridge, presenting on its north side an abrupt face forty feet or more in hight, of massive serpentine. The ledge is strongly jointed and apparently free from minor checks or subjoints, and I should judge that perfect blocks of any desired size could be obtained. On close examination the veining on the smooth, weathered face of the bluff is plainly visible; but to "bring it out" fully the surface requires to be polished. It presents then all the imaginary shades of green, varying from a deep greenish black to a pale pea green or greenish white. The darker green, often semi-translucent, forms the rich background of the polished surface, which is beautifully mottled and enriched by delicate moss-like tracery of the lighter shades, and the entire surface is then rendered mosaic by irregular veins of greenish white marble traversing the rock in every direction, and even then, as if nature were not satisfied, to enhance the pleasing effect still more, are minute veinlets "shooting out" from the larger ones, which, in their branchings, finally disappear, blending imperceptibly with the dark background.

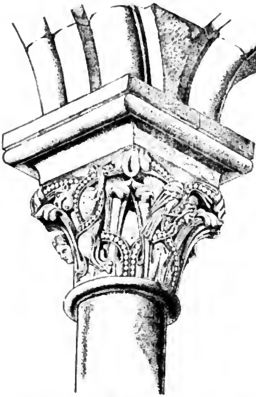


FIG. 2.

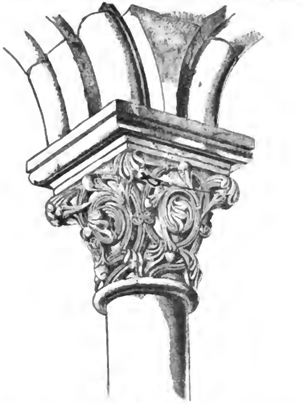


FIG. 3.

Further to the east the ridge becomes broader, and there rises up on its north side a ledge of very handsome marble breccia. The colors of the breccia appearing on the polished surface are white, yellow, brown purple, drab and blue, with numerous shades of these producing indescribable combinations. The polished specimen in hand is traversed by a large vein of coarsely crystallized marble, and in the vein are strewn angular fragments of the colored base of the rock. The rock resembles in many respects the famous *Breche Herculaneum* from Belgium. A little farther east is another large outcrop of serpentine marble, which is very similar to the celebrated *Vert Maurin* from Grenoble, France. It is slightly mottled, and is thickly veined with white and pale green marble. There is a certain parallelism to the veins which is very apparent when viewed at a distance.

Continuing east, we pass another ledge producing a variety of marbles. One, particularly noticeable, has a sort of wavy appearance from fringy-like colored rows of shades of green and yellow. It is an odd-looking specimen. The most easterly ledge I examined was a large outcrop of dolomitic marble. It is massive, and apparently free from seams. The polished specimen is beautifully clouded and mottled with the various shades of grayish white and light drab; it is also traversed by white veins of coarsely crystallized marble, which often contains small concretions resembling fossil remains.

Another specimen, taken from a low ledge just east of here, is very attractive. It has a very rich dark green color, sprinkled with fleecy clouds of a little lighter shade; it is also veined with branching veins of pale green, and others with bright glistening seams of copper-colored penninite, which latter sometimes has a soft silken luster. The specimen takes a high polish. These are only a few of a very large number of different specimens, and it would seem represent nearly all the possible varieties of serpentine marble, and the quantity appears to be "practically" inexhaustible.

A patch on a boy's trousers is something new under the son.—*Boston Traveller.*

NEW ENGLAND BUILDING STONES.

IT is worth while to notice the general relations of the New England quarry industries to the rest of the country, as we may thereby gain the basis for a forecast of their future.

A glance at a geological map will show that the rocks that characterize New England are not found in an equally extensive development in any other district south of St. Lawrence and east of the Rocky Mountains. The same highly metamorphosed series of rocks is continued in a less extensive way south along the whole chain of the Appalachians as far as northern Alabama; but it leaves the sea-board region at New York, and south of that point is not readily accessible to tide-water navigation. Moreover, when we get even as far south as New York we find that, owing to the progressively less and less considerable development of glacial action in southern regions, the rocks show the effect of decay to a much greater depth than they do in New England, where the last glacial period stripped away all the incoherent decay portion of the rocks, leaving only that which was well suited to the use of the quarryman. The result is that even near New York, and in a greater degree for every step eastward, the stone is decayed along the joints to such an extent that we can rarely find good solid blocks within from 20 to 50 feet of the present surface. This deep "cap" of decayed rock is a serious hinderance to the development of good quarries of crystalline rocks in a large part of the southern Appalachian mountains.

These two advantages, the neighborhood of the crystalline rocks to the sea and the absence of any worthless decayed upper part, will always give the New England rocks of the granitic group a very great advantage over those of any other part of the eastern United States.

It should also be noticed that the cost of quarrying granite of good quality is perhaps less than that of any other work of the same general utility, certainly much less than the cost of our other principal building stones, so that, for all large structures where rude strength is the only need, quarries of this stone are always likely to be at a great advantage in production.

There are no other sources of supply of granite that are ever likely to compete with this stone district of New England. The same qualities of stone are found in southern Nova Scotia with the same advantages of quarrying; but this region is on the average several hundred miles farther from the principal points of consumption, so that the tax due to distance will always amount to about as much as the present profits of the New England quarries; The cost of carriage on a ton of stone from Nova Scotia above that from Cape Ann, supposing the distribution to be to New York or Philadelphia, is probably more than the average profit made upon the stone itself. Thus there could be no effective competition save for such stones as have been carved or finished, so that the actual value bears a very large proportion to the original cost of quarrying and conveying to market. It is quite clear, therefore, that the position of the New England granite quarries is particularly favorable, and that they are likely to command the market for cheap stones for a great while in the future.

The same may be said, though in a less emphatic way, for the other building stones of this region. The roofing slates, particularly those of Maine, the exploration for which has hardly begun, are well placed for marketing, as they have the same advantage, arising from the small amount of waste rock on their surfaces, that the granite quarries have. The slates have rather more drift matter upon them than the granite quarries have for the reason that they generally lie in rather lower ground; still this drift is loose material requiring no other than pick-and shovel work before the profitable work is attained. In Maine, especially, these quarries lie near enough to tidewater to share the advantages arising from their method of carriage, being not more than from 30 to 60 miles away from the nearest tidewater navigation.

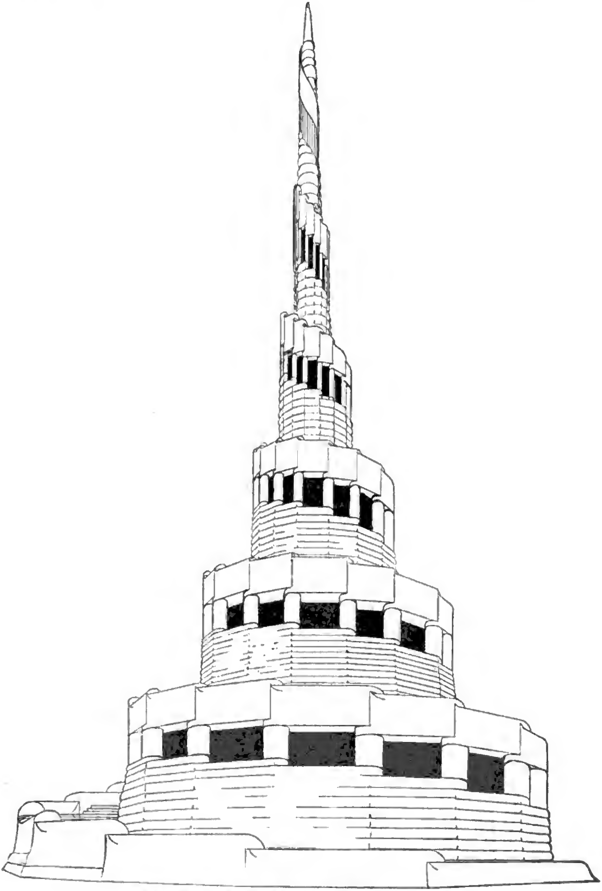
There are no certain supplies of good marble within a remunerative distance of the shore-line of New England, the nearest approach thereto being the extensive deposits of serpentine rocks that lie in Middlesex and Essex counties, Massachusetts. Between Lynnfield and Newburyport there is an extensive deposit of this character that will afford a material suitable for the carver's art.

AN INFANT INDUSTRY.

COMPARATIVELY speaking, the quarrying interests of this country are in their infancy. The undeveloped stone resources of the country bear the relation to what is known for certain as a mole-hill to a mountain. Considerable has been done in this state in the way of investigation into its stone resources, yet there are immense fields still undeveloped. We have quarries of sandstone which have been exposed twenty and thirty years without damage, yet it is not known outside the immediate neighborhood. In other counties we have stone of the finest quality, beautifully marked and variegated and susceptible of a high polish, in immense quantities yet unknown in the markets even of this state. Granites, marbles and what-not of other states are constantly being brought to our attention through geological investigation, business enterprise, and otherwise. Improved methods of handling stone which has the effect of reducing the cost of quarrying and working will do more than anything else to increase the use of stone, both in an absolute and relative sense. We know that there is more stone used on account of the increase of wealth and population. But through its decrease in cost, because of the improved methods of working and handling, it will be used proportionately more. There will be more stone used in proportion to the amount of building than in the past because stone is cheaper and better known. The increase in the variety of stone at hand tends to increase the use of all stone. The appearance of the buildings which are rendered more beautiful by the variety as well as by the improved mechanical devices which tend to reduce the cost of ornamental work, invites public attention to stone, and in that way proportionately increases its use. For this reason it takes the place that would otherwise be occupied by terra cotta, brick, artificial stone, galvanized iron, and other material. The architects are having a good deal to do with its increased use.

It is not long since that the use of terra cotta was relatively very great. Now, in the prevalence of the Romanesque style of architecture, which invites the use of stone more extensively, and for other reasons, terra cotta has fallen into the decline, not because it is not a good building material, but because it is simply taking its proper place. While terra cotta was no experiment, generally speaking, it came in as a new thing, relatively, to the architects a few years ago, and they took it, hook, bait and line. Everything was terra cotta. There has been a reaction. It favors stone. Thus through the immense quantities of undeveloped stone resources, through the means of cheapening its use, and a general feeling which is particularly favorable to it, it is to be expected that the stone industries of the country will constantly become more important and more active.

A large quantity of white marble has been discovered near Chewacla, Ala. New England experts have been there to examine it, and pronounce it a very fine quality of white marble; quantity in exhaustible. A company is being organized to work same.

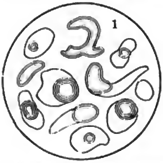


DESIGN FOR INDIANA STATE SOLDIERS' AND SAILORS' MONUMENT

By E. S. Jennison & Co., Chicago.

GRANITE CRYSTALS.

When the large crystals imbedded in granite rocks and some lavas are examined with a microscope, they are often found to contain numerous minute cavities each of which contains a liquid and a bubble of gas. These cavities are very minute and so numerous that there is hardly any estimating the number contained in the crystals. An increase of the power of the microscope brings to view new and smaller ones, and it has been estimated that in some instances there are from one thousand millions to ten thousand millions in a cubic inch of space. The water in these cavities often contains saline matter in solution, and in some instances crystals of salt appear floating around. In other cases the liquid is some hydrocarbon and at times liquified carbonic acid.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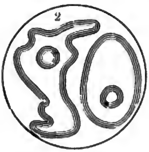
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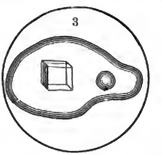
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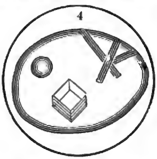
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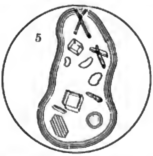
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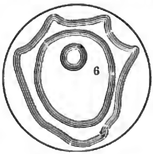
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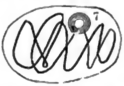
Nos. 1 and 2 show crystals which contain water cavities in each of which a bubble of gas appears. It has been noticed that when the position of the crystal is altered the bubble moves to the top as it does in a spirit level. This is true of the larger cavities. In the smaller ones the bubble seems to have the power of spontaneous movement and is constantly changing position. Figure 7 shows the path of such a bubble. In figures 3, 4 and 5 there will be seen minute crystals in the water of the cavity. In No. 6 there are two liquids and a bubble.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DYNAMITE BLASTING.

Foundations and wheel pits are all the better where a hard, rocky foundation is to be had, but the mechanic often dreads them, on account of blasting necessary to get the exact depth necessary. Gunpowder blasting is pretty well understood, but it is slow work compared with dynamite, or any of its compounds, such as forcite. Hercules or Atlas powder, and many others.

These agents are no more dangerous than gunpowder, but possess double the power where used with good judgment. Powder may be fired with the ordinary fuse, but dynamite will not take fire from such methods. In firing all the higher explosives, they are so combined with some base, such as sawdust or clay, than an intense heat is needed to ignite them. This renders them safer, but also calls for the use of a cap on the end of the fuse which is in contact with the explosive.

One of the salts of mercury called "fulminating mercury" is used. This substance is used for priming gun caps and metallic cartridges, and gives a most intense heat when ignited. A portion of this salt, confined at end of the fuse by a price of brass tubing, will cause any cartridge of high explosive to explode, when the fuse is fired.

Electricity is the best method of exploding dynamite, or any other cartridges used in blasting. The method is extremely simple. Two wires are led from the battery. They are joined by a short piece of iron or platinum wire, and the salt of mercury packed around this small wire. The electric current heats the small wire red hot, and ignites the fulminate. A magneto firing dynamo is not always available, neither are electric light wires, although firing can be done pretty well with the current obtained from a single incandescent lamp connection, after removing the lamp from a live circuit.

A bunch of arc light carbons, a sheet of zinc twelve inches square, one pound of sulphuric acid, and another of bichromate of potash, will make a battery capable of firing a charge of dynamite through 300 feet of No. 16 copper wire.

Bend the zinc into a cylinder, wind a piece of marline top and bottom, to prevent contact of the carbons, and place the latter in position outside the zinc cylinder as another cylinder entirely around the zinc. Tie firmly in position. Dissolve the bichromate of potash in a pail of water, add the sulphuric acid and immerse the zinc and carbon, touch the lead wires to zinc and carbon respectively, and the small connecting wires will be burned off by the heavy current generated. Remove zinc and carbon, wash, and they will be ready for the next charge.

If the caps are not to be had all ready for firing by electricity, procure some long 32 copper cartridges, pull out the bullets, twist together two pieces of insulated copper wire, No. 16, and connect the twisted ends by one eighth inch of wire from the G string of a violin. Any amount of this fine wire may be twisted around either copper wire, but the distance between must not be over one-eighth of an inch, or more voltage will be required than one battery can furnish.

Put wires thus fixed into copper cartridge, pour in some powder, and press in some beeswax, to hold the wires in place. Insert the whole rig in dynamite cartridge, and the battery will fire it for you. There is fulminate enough in a cartridge (rim fire) to ignite the dynamite, when used with the powder in the shell. Common powder may be fired by simply placing the prepared wires in the powder without any fulminating cap.—*Manufacturers' Gazette.*

"Mike, did you ever catch frogs?"

"Yes, sorr."

"What did you bait with?"

"Bate 'em with a shtick, sorr."

CORRESPONDENCE.

CORRESPOND WITH US!

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

Cutters Wanted.

To the Editor of Stone.

SIR: We are in immediate need of about 50 granite-cutters and 35 paving cutters, but only good men can be used. We can guarantee them steady work! Can you not aid us in procuring these men?

We have now at work in our Lithonia quarries about 500 men, but in order to meet with promptness all orders, it has become necessary to increase our force to 700 men at once. We will ship this year not less than 3,500,000 paving blocks, 50,000 feet fine curbing, and a large amount of orders for building stone for government and other work.

Yours truly, THE SOUTHERN GRANITE CO.

Atlanta, Ga., Aug. 27.

An American's Idea.

To the Editor of Stone.

SIR: A word in relation to our Soldiers' Monument: The commissioners seem qualified for their part of the undertaking, judging by requirements and specifications as set forth in your journal, with one sad, aye, scandalous exception: Where is their pride of country?

Sending to the Old World for the subject-helots of European despotism to show us Americans how to build monuments, or anything else, at this hour of the day, is simply outrageous—an additional evidence, if any were necessary, of the decline of that genuine American spirit so characteristic of the earlier days of the Republic.

Fraternally and very respectfully, JOHN O'HALLORAN.

Washington, Ind., Aug. 15.

We believe had our friend seen all of the designs presented in the competition, he would not find fault with the commisioners for the selection of a foreign design. Again, they were not aware of its geography until after its selection.

A PROSPEROUS COMPANY.

The Blue Ridge Marble Company's works are located in Nelson, sixteen miles north of Canton, Georgia. In June, 1886, this company purchased 160 acres of land there in woods, and have since put up quite a number of splendid business and dwelling houses, a magnificent plant, numerous shops, warehouses, etc., all lighted with electric lights, and with the many other houses which have been built by others, Nelson now begins to present quite a city appearance. The company employs from 100 to 120 hands, and keeps the works running day and night. Even with this force, Col. Dewar, the general manager, says he is unable to keep up with the orders. He is now at work upon a $10,000 order for marble to be put into the office of the Caldwell house, now building in Birmingham. In view of this fact, and the constantly increasing business, he is desirous of procuring twenty or thirty more cutters and as many more hands as will be needed as fast as the cutters come in.

"Mr. Sampson asked me to be his wife last night, papa."

"And what did you say?"

"I told him he must give me a little time, and he said I could have the usual thirty days, or 5 per cent. off for cash, and then he stopped and apologized. What am I to think of him, papa?"

"Think of him?" shouted the old man. "That young fellow is full of business, and you can't say 'yes' too quick!"—*Grip.*

STONE AND THE MILLS BILL.

THE Committee of the Whole of the House of Representatives refused to strike from the Mills bill the following clause:

"Stones, unmanufactured or undressed, freestone, granite, sandstone, and all building or monumental stone."

The provisions of the previous law were explained by Mr. Bynum in its relation to the present law thus:

The provisions of the existing law, of which this is an amendment, is as follows:

Stones, unmanufactured or undressed, freestone, granite, sandstone, and all building or monumental stone, except marble, not specially enumerated or provided for in this act, $1 per ton; and upon stones as above, hewn, dressed or polished, 20 per cent. ad valorem.

It will be seen that it is not sought to place hewn, dressed or polished stone upon the free-list, but the same are left to bear the rate of duty now imposed.

Mr. Lehlbach moved to strike this clause from the bill. He said:

I offer this amendment, Mr. Chairman, in good faith, and hope it will be adopted. Any person who would class stone unmanufactured or undressed as raw material certainly must be entirely ignorant of the manner in which it is quarried. Stone does not lie on or even near the surface, and can only be placed in the market ready for the stone-cutter's skill after the expenditure of a vast amount of labor.

In sandstone—and I speak from personal knowledge and experience—it is necessary before reaching the stone to remove the earth bank lying above, varying in depth from 15 to 35 feet. This requires labor, and the cost of this stripping one is one of the expenses that adds to the cost of production. For ervery thousand dollars' worth of stone laid on the bank, $900 at least have been expended for labor. In my district there are now ten quarries in operation. The wages paid to those employed in these quarries are from $1.50 to $2.75 per day. Those receiving $1.50 per day are the unskilled laborers who handle the pick and shovel, and are engaged in stripping off the earth, loading up the wagons, etc. The rockmen and scabblers receive from $1.75 to $2.75 per day, this work requiring skill and experience. The amount paid for wages in our quarries is from two to two and one-half times more than the wages paid in Europe or Canada. Up to this time the duty which is but 21.22 per cent. ad valorem, has been sufficient to prevent any considerable importation, the amount collected for import duties on this article for the fiscal year ending June 30, 1887, being but $3,513.18.

The freight charges on the stone which is imported, coming over 3,000 miles, are less than those paid here for inland transportation of only a few miles, as it comes mostly as ballast.

Mr. Breckenridge, of Arkansas. Mr. Chairman, there is a marked difference between marble and stone of the character enumerated in these lines, marble being more costly, and freight that might be a perfectly ample protection on cheap stone may not be an adequate protection for the more costly kinds; and that difference should be distinctly kept in view.

I think it very likely that the gentleman will find upon investigation that the freight on stone of the character herein enumerated will amount to as much as the wage per ton in getting it out.

Mr. Lehlbach. I would like to state to the gentleman for his information that this character of stone which comes in now is free as far as freight is concerned, because it comes as ballast.

Mr. Milliken. Now, my friend states that the difference in freight is equal to the cost of the production of the granite. Does not my friend know that the difference in freight between granite produced in New Brunswick, where the quarries of red granite and gray granite and all kinds of granite are as inexhaustible as they are in Maine, and the granite produced in the state of Maine is no difference at all? The gentleman cannot stand up here and deny that granite is brought as ballast in vessels from Scotland. Is not the freight greater upon marble? Who is to compete with him? Not New Brunswick; not any contiguous foreign country; not any lands that lie next to us, not any country as near as Scotland. His marble competes with Italy. Is not the freight upon marble from Italy here greater than the freight upon granite from Scotland, even if it does not come in as ballast?

The following, among other letters, was read:

WESTERLY, R. I., June 18, 1888.

DEAR SIR: Your favor of the 14th instant is duly received, and, in reply, we submit the following:

We are not necessarily interested in sandstone, freestone or marble, except as we are sometimes obliged to purchase a small quantity to complete some contract, and so you will understand us as speaking particularly of granite.

	Per week.
Common laborers in Scotland	$ 4.50 to $5.00
Common laborers in America	10.80 to 12.00
Paver-cutters in Scotland	7.00 to 8.00
Paver-cutters in America	18.00 to 21.00
Granite-polishers in Scotland	4.50 to 5.00
Granite-polishers in America	10.20 to 11.40
Cutters (skilled) in Scotland	7.00 to 7.50
Cutters (skilled) in America	15.00 to 19.50

With granite placed on the free list it would be impossible to compete with European cheap labor in our business, and, in our opinion, this great industry would be paralyzed.

With the enormous difference in the price of labor which we have shown, the duty of 25 per cent. ad valorem should be doubled in order to give full protection to this business. Duties on foreign imports, made for "revenue only," is a pernicious doctrine which should be repudiated, together with the party which invented it.

The vicious reduction of the tariff, as proposed in the Mills bill, would deprive intelligent labor, as well as capital, of its just reward and degrade all of our great industries to the foreign standard.

We regard it to be the duty of every patriot to oppose such a destructive measure.

Yours respectfully,
THE SMITH GRANITE COMPANY.
Orlando R. Smith, Treasurer.

Hon. Warren O. Arnold,
House of Representatives, Washington, D. C.

In the course of the debate a letter was read from an old stone-cutter, Mr. P. B. Laird. We make a short extract:

> I am an old stone-cutter, and worked from 1851 to 1861 as a granite stone cutter, most of the time in Boston, and during a period of Democracy and free trade. The best workmen among us did not earn in any year of that period more than $1.50 per day. From the time we got the tariff on monuments, in 1861, to the election of Grover Cleveland, good workman were able to earn $4 per day, a difference in our pay per year of $750 in favor of protection.

In the matter of the manufacture of monumental work, and its competition with the American manufactured goods, we submit the following strtement from the *Granite Cutters' Journal*:

> On a small monument costing $100 to manufacture from Quincy stock, the freight, the duty, etc,, can be paid and the monument delivered in New York for $21 cheaper than the Quincy one can, besides the cost of freight from Quincy to New York, the freight from Quincy to New York having to be added to the price marked, but only in Concord granite is figures lower, or as low, as the imported granite, but in that case the added freight would bring it about equal with the imported, or nearly so, and we quote one of Quincy at $160; Barre, $152; Concord, $135; red or gray Scotch granite, $139, the Concord price being $4 less than the Scotch one, but any one knows that $4 would not pay the freight charges from Concord to New York. Another Quincy, $200; Barre, $200; Concord, $180; red or gray Scotch granite, $175, thus the imported one is $5 cheaper than the Concord one and $25 cheaper than the Quincy or Barre one from the same design.

BETTER BUILDING.

If we take a pioneer region we will find first, a log hut, next a building of rough boards to be followed by one of more substantial dressed material. Next a frame building somewhat pretentious in character, having some regard for external appearances. Such a structure is followed by an admixture of more elaborate wood buildings and brick houses. Next comes the addition of stone trimmings to the brick building. The proportion of stone work increases, until in the end we have a number of stone buildings. This is in short form the history of architectural development. The use of stone is constantly increasing in excess of the increase in population of the country. The increase in wealth suggests a corresponding increase in the use of stone for building material. The introduction of Romanesque architecture in this country has had not a little to do with the additional use of stone as a building material. There was a time when pressed brick and terra cotta had a rage, and stone was neglected. That proved to be a short craze, however, and a return to stone structures was followed by a vigorous revival in the extended use of that material. Now the use of stone in building is largely in excess of that of a few years ago. Wealth looks beyond brick, wood or terra cotta. The country is rapidly becoming very wealthy and the use of stone correspondingly more common. Another quality which is conspicuous in the use of stone is, that there is less of a disposition toward veneering and a greater tendency toward stone solid in the walls. This indicates a proper spirit in building matters.

A cradle in a house may or may not be a boycott.—*New Orleans Picayune.*

TENNESSEE MARBLE.

The colored marbles of East Tennessee are well known not only on account of their beauty, but because of the ease with which they are worked. They are not so well adapted for exterior use as those of the Champlain region, the latter being harder and better able to withstand the weather, but for inside use they are selected because of the ease with which they can be worked.

The quarry of the Knoxville Marble Company is situated a the junction of the French Lick and Holston rivers. It is perhaps the largest in the state. It was opened by the government to get stone for the construction of the Knoxville custom house and post-office. It was also used in the state building at Albany, New York. It does not stain rapidly and seems to withstand the weather. It has been used in tombstones for thirty years and shows no signs of decay. The exterior of the Knoxville building is of bush hammered while that used for the interior is polished. The bush hammered surface is nearly white, while the polished surface shows a pinkish tinge with wavy, dark lines running through it.

The quarry at Moorsville is the oldest in this region, and has been used extensively throughout the country. It also was opened by the government for the purpose of getting ornamental stone for the capitol at Washington. It has not been used for general constructional purposes on account of the high price it brings for ornamental uses. The price per cubic foot at the nearest railroad station is $2 and $3.

There are two quarries within two miles of Knoxville owned and operated by Messrs. Frierson & Morgan. The stone is known as Knoxville marble. One quarry produces a pink marble and the other a stone which is white and shows upon analysis that it is nearly pure carbonate of lime. The custom house at Memphis is built from this stone, as is the shaft of the Lee monument at New Orleans.

PRIZE DESIGNS are mentioned on another page. It is our intention to offer prizes for these designs in monumental work, so as to include a wide range of subjects, and we hope to receive many responses from monumental designers, draughtsmen and architects. We are persuaded that it will be of interest and value to all alike. While the amount of the prize offered may not, in all cases, be commensurate with the value of the service rendered, we hope that it will serve as a sufficient stimulant to add interest to the work. If our plan does not meet with favor in respect to any of its details we would be pleased to receive criticism in regard thereto. It is the scheme usually followed in receiving and acting upon general competitive designs. However, our only interest in this matter is that of our readers.

A portion of a petrified tree was discovered in a solid sandstone rock quarry, at Zanesville, O., the other day. The tree is about the thickness of a telegraph pole and has well-defined bark and roots. It was found while blasting, or immediately after a blast, fully sixty feet below the top of the hill, and was in solid rock. Over it is the earth formation, then a species of shale, then limestone strata, followed by a conglomeration of stone, then some forty feet of solid sandstone, near the bottom of which is the petrified tree.

Wax is a substance secreted by the bees, and is enalogous to the fat of higher animals. To produce a single pound of wax, bees must consume from fifteen to twenty pounds of honey. The expensive substance is used by the thrifty little insects with the greatest economy. The thickness of the cell walls in a new comb is said to be only 1-180th of an inch.

LITHOGRAPHIC STONE.

An article lately published in a very popular paper and extensively copied contains some grave errors about lithographic stones in America, and in connection with a review of this material I will also correct these errors.

Lithographic stone is a fine grained, siliceous limestone containing some alumina. It is most possible to find it of good quality in the sub-carboniferous formation. For many years almost the total supply of good stone for the whole world has been obtained from Bavaria, where there are two great quarrying and shipping places, Solenhofer and Pappenheim. The stone is cut to sizes and dressed ready for use at the quarries. The quarrying and dressing requires considerable skill and careful manipulation. The uses of lithographic stone have increased so enormously that the supply for this country possible from the Bavarian mines has greatly decreased, hence much inquiry and search has been made to obtain a stone of good quality in this country. The writer above alluded to, who probably is one of that class of literary men about New York, one of whom wrote an article about the River Platte in the state of Texas, with an ignorance on the subject he writes, except as to the beer drinking quarriers of Solenhofer, states that "America, having no geological formation of the kind of her own, has to send to Solenhofer for this stone."

As far back as 1880 Mr. W. D. Geoghegan, of Louisville, Ky., found in Clay and Overton counties, Tenn., a first-class stone. He has had hard work to introduce it, but patience and perseverance has had its reward, and the last issue of the "Mineral Resources of the United States" states of it: "A number of lithographers have subjected this stone to practical tests, and as a result of this experience express themselves as highly pleased with it, and in one case it was pronounced superior to any German stone previously used by them."

The imports of lithographic stone from 1880 to 1887 were:

1880 in value	$ 42,709
1881 in value	77,894
1882 in value	111,925
1883 in value	104,313
1884 in value	128,035
1885 in value	54,022
1886 in value	71,009

Lithographic stone is used in almost every character of printing, and its use is interesting. The value of the stone depends upon its not being too hard or too soft and upon its absorption of water. During the war much of the Confederate money was printed on stone, but now all blank bills are from steel plates. All fine quality of colored printing is made from lithographic stone. This printing is done in two ways, by transfer from a print made from copper or steel plate, and by direct etching on the stone. The stone is dried in an oven and the print or transfer is made on it, the oily ink sinks into the porous stone and the impression is there. Then the stone is rubbed over with a soft sponge dipped in water and every place but that where the oily ink has made its impression absorbs water. The stone may then be rolled over with the ink roller, and no part except where the ink impression is will take any ink. The sheet of paper is then put on and the stone run under the press, and printed. The sponge and water and inking operation is done and another impression taken, and so on until the original transfer on the stone becomes too much worn. Then the stone is ground down smooth and another print made. Where various colors are to be made, as in chromos, two or three stones are used. Sometimes the print is engraved on by etching with acids.

In the lithographic stone of commerce there are several varieties, first classed according to color and then hardness; the yellow-buff and pearl or bluish-gray are the chief colors. The first is usually a soft stone, the latter hard. The "Mineral Resources of the United States" quotes the price as, for small sized blue-gray stones, five cents per pound, same sized buff stone three cents per pound, larger stones proportionately higher. The greatest demand is for slabs twenty-two to twenty-eight by forty inches and of a blue-gray variety.

There is a possibility of finding this stone at any point on the northwestern wall of the Cumberland table-land in the sub-carboniferous formation. So far, the best stone has been found in Clay and Overton counties, about four miles from the Cumberland river. It is possible to find it in Putnam, White, Coffee and Franklin, in Middle Tennessee, and in East Tennessee in Campbell county, on the northwestern wall of Pine Mountain, the eastern boundary of Elk valley immediately on the Knoxville & Ohio railroad. Its quality may not be as good at those places or it may be very thin, but it is possible to find it there. I have seen what appeared to be good blue-gray stone on the road to Bon Air above Sparta, and also in the Pine Mountain side facing Upper Elk Valley. So far from America not having any formation where it is possible to find this stone, the South alone has large areas of such formation, and has the stone itself in large quantities and of a quality equal to the very best Bavarian stone. The American Lithographic Stone Company comprised of capitalists from Louisville, Ky., are already operating quarries in Overton county, and all tests having proven their stone to be the best quality, it will not be long before on the banks of the Cumberland will be the Solenhofer and Pappenheim of America, and it may be that from there will be furnished a large part of the stone for Europe, as, contrary to the statement of the writer above quoted, the best authorities state that the quality of the Bavarian stone is deteriorating and the supply decreasing.

A very handsome stone from McMinn county was sent to me while in the Agricultural Department, but it seemed to be too hard. As seen by the statements of imports the money amount of business to be done is not very large, the highest valuation of all imported, having been in 1884 only $128,035; not more than enough to promise a fair profit to one well managed and well equipped quarry. It must be remembered that a stone 3 to 3½ inches thick will last a long time. It may to-day be used for a concert bill, depicting the feats of some more than half-naked beauty, in a day or two after be the means of showing to the world some artist's idea of a Scripture scene; it may one day be the means of depicting the glories of some lager beer or fancy whisky, and the next, of illustrating the horrors of intemperance. Through all these transmissions its face is gradually wearing away, and though it may be eight or ten months, it will become too thin and be thrown on the scrap pile.

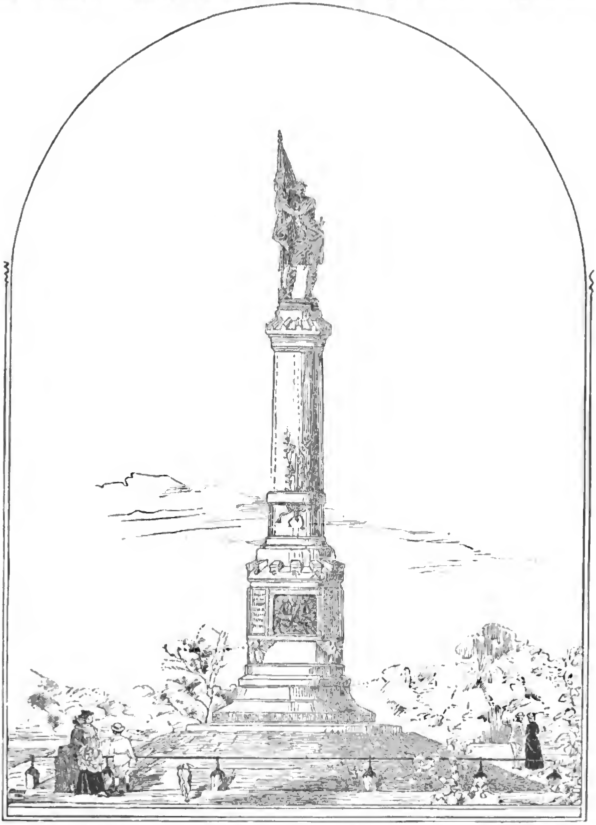
"The Mineral Resources of the United States" says: "A drawback which has thus far presented itself in the development of deposits of lithographic stone in the United States consists in obtaining men sufficiently skilled in quarrying, selecting and dressing the stone to put it into hands of the consumers in the best shape." The editor might also have added the great difficulty in making our people believe that anything produced at home is as good as that which comes from abroad. As to lithographic stone, another great obstacle is from the fact that nearly all the lithographic printing is in the hands of foreigners.—*Henry E. Colton, in The Tradesman.*

"What's the matter sonny?" "P-pa's been w-whippin' me hard.' "Why did you go against any of his rules?" "I should say I did. The hardest one he's got, for 'bout s'teen minutes."—*Judge.*

Speaking of music—dough is the first note on the staff of life. —*Springfield Union.*

THE JASPER MONUMENT.

OUR illustration is a fairly executed engraving of the proposed monument to Sergeant Wm. Jasper, at Savannah, Ga. The design was executed by Henry O. Avery, of New York City.



Sergeant Jasper was born in South Carolina about 1750; enlisted in the 2d South Carolina regiment at the commencement of the Revolution; became a sergeant, and distinguished himself in the attack upon Fort Moultrie by a British fleet, June 28, 1776, by leaping through an embrasure under a galling cannonade to recover the flag of the state, just shot off. In recognition of this act of heroism Gov. Rutledge gave Sergeant Jasper his own sword, offered him a commission as lieutenant, which he declined, and employed him thereafter upon outpost and picket duty, in which he frequently distinguished himself by deeds of eccentric daring. In the assault upon Savannah (Oct. 9, 1779) Sergeant Jasper accompanied D'Estaing and Lincoln in their attack upon the Spring Hill redoubt, and was killed while attempting to fasten to the parapet the colors of his regiment, presented by Mrs. Elliott. A square in the city of Savannah and a county in Georgia bear his name.

The money to build this monument was solely by subscription among the Irishmen who hold in reverance the memory of the brave Sergeant, who, though a native of America, was a "true-born Irishman."

The principal bas relief in the design represents the emblematic figures of Erin and Columbia joining hands. The other two bas reliefs illustrate daring exploits in the career of Jasper.

The design in capped by the castellations and stars emblematic of the Union at the period of the Revolution. The main shaft is intertwined with sword and laurel.

LAKE SUPERIOR BROWNSTONES.

SKIRTING the south shores of Lake Superior, at intervals, may be seen beds of sandstone resting nonconformablly against the archæn rocks. At some points, as at Grand Island—where the "capping strata" are more highly indurated—the sandstone forms high bold cliffs, as those of pictured rocks at Grand Island, discolored from the decomposition of thin seams of pyrites.

These sandstones are supposed to belong to the Potsdam period, and therefore form the base of the lower Silurian. The sandstone is usually of a brownish color, and many of the shades are very rich and warm. At Marquette and L'Anse have been opened brownstone quarries which are now furnishing a very excellent building material that is rapidly gaining favor among architects. The quantity of stone at these quarries, so far as developed, is apparently inexhaustible, and the quality fully equal to the best Eastern grades. This interest, however, is only in its infancy; and there can be no question but that it will grow and eventually become one of the prominent industries of the state.

The Marquette brownstone quarry is located in the southern portion of the city of Marquette, and is only a short distance from the lake shore. The brownstone is one of the layers of the Potsdam sandstone, which at one time covered the greater portion of the lower horizon of the Lake Superior country, but now only limited fields or small patches remain. About Marquette are narrow ridges of greenstone and quartzite of the Huronian period, having an east and west trend, and which rapidly terminate as we approach the lake. In these sheltered bays, bound by the termini, or spurs, of the ridges, are often small fields of sandstone.

The L'Anse brownstone quarry is situated about one and three-fourths miles northeasterly from L'Anse, on the shore of L'Anse bay, and possesses many natural advantages that could hardly be more desirable. The first work was done in this location in September, 1875. The docks are conveniently located abreast of the quarry, a tram road is laid along them, and everything is so arranged that by means of derricks the large blocks of sandstone are swung directly from their beds and loaded on the tram cars, or, when desired, are stored away to one side ready for future shipment. At one end of the dock other derricks are erected to transfer the stone from the cars to the vessels.

The first shipment of stone, consisting of ten tons, was made to Chicago by rail, in March, of 1876, while the entire product of the quarry for that year amounted to 8,500 cubic feet; in 1877 the product was 10,000 cubic feet. The thickness of the bed varies from four to fourteen feet, and is 700 feet in length. The stone has a rich brown color, and is very even in texture. The upper portion of the bed is frequently slightly banded with light grayish layers, alternated with browish ones. Some portions of the bed are somewhat mottled with pale greenish-gray spots of from one-eighth to three-fourths of an inch across; no difference, however, can be detected in the hardness of these spots and the material which incloses them. It appears that the only difference consists in the color, which, in all probability, is due to the unequal oxidation of the protoxide of iron; that is, it is possible that the entire bed was at one period of a much lighter shade than it is now.

The formation in which this brownstone occurs belongs, as before stated, to the Potsdam period, and the stone being almost horizontally bedded enables nearly perfect blocks of almost any desired size to be obtained; as for instance, a block was taken from the main bed, and practically perfect in every respect, of which the dimensions were 34 feet in length 12 feet in width and 10 feet in thickness.

ARKANSAS GRANITE.

Near Little Rock, Ark., there rises a hill of pure granite directly from the soil of the country, it being of the tertiary or most recent formation. It has been for sometime a question with the state geologist whether this granite mountain was a part of the oldest rock which had reared itself so high that the other strata on being deposited had not been able to cover it, or whether it had been thrown up through a fissure in the earth at some comparatively recent date, much as volcanoes are erupted to-day. There was but one way of settling this; that is, to find the exact point where the granite rock meets or joins the tertiary. If at this point of junction granite should be found filling veins running out from the main line of joining it would be proved that it was of recent origin; but, if on the other hand, it were found that the other rocks had been deposited uniformly around its base it must be of the oldest formation. For some time the state geologist had sought this juncture, but was only successful in finding it some four or five weeks ago. In riding over the country he and a number of the voluntary geological corps, which have been at work in Arkansas this summer, found what had so long been sought. Following the line of junction it was discovered that the granite filled little veins and dikes which were made at the time the surface was broken open by the eruption of this granite in molten state. The line was followed for some considerable distance. This proved the granite to belong to the tertiary period. The work will soon be completed and incorporated in a map, which is being prepared, of some twelve square miles of that country, which map is being made with an accuracy almost unknown hitherto.

ALABAMA LIMESTONE.

Appended are analyses of stone from two quarries near Sheffield, Ala.

The limestone at present is being brought in about 20 miles from Fossick's quarries, on the line of the Sheffield and Birmingham railroad, delivered at a cost of 75 cents a ton. About thirty feet in the bluffs, on which the town of Sheffield rests, is a very high grade stone, which can be held as a reserve.

	Fossicks.	Bluffs.	
Silica	.431	.320	.632
Alumina	.268	.250	.346
Carbonic iron	.341	.207	.631
" lime	97.730	98.060	96.903
" magnesia	1.008	1.050	1.451
Phos. acid	.023	.023	.037

IN THE BEGINNING.

HISTORY cannot write its own beginning. We can know nothing of the first men who appeared upon the globe, though as time advanced each generation left a more intelligible record of their life. This has been the history of the globe itself. We have progressed from a history written with stone arrows to one which is recorded in printed form. Through the rocks and the fossils contained in them we can read part of the history of the world, tell tells the conditions under which the rocks were made and the life of the animals living at the time of this formation. But the beginning of the world we cannot trace. Our knowledge ends when we reach backward to the formation of the first, or igneous rock—to our granites. Before that we can only get a hint, can gain an idea of what must have existed by our knowledge of phenomena at the present time, and by the result which we can see around us. There is no time in the history of the world where we can read the records left with unerring certainty, but every year brings more light, and in time the history of our globe will perhaps be as well known to us as the history of our country. Agassiz says: "It is my belief that not only the future, but the past also, is the inheritance of man, and that we shall yet conquer our lost birthright."

For many years there was no theory advanced in regard to the beginning of our world which at all accounted for facts which we see before us. When Sir William Herschel propounded his famous nebular hypothesis it was soon recognized that it explained all of the more important phenomena, not only of early geology but as well those of astronomy. To-day it is generally accepted as explaining the origin of the universe. The space of this article will not permit us to give the reasoning which brought to life this theory. We can only give in shortest form the theory itself. According to Sir William Herschel the whole universe was, at the beginning, a mass of incandescent vapor which, as it began to cool, became more and more condensed, the portion on the outside being cooler than the center. This unequal cooling produced currents from the hotter center to the cooler surface, and following these there set in a rotating or whirling movement. This movement of gaseous, or even semi-fluid matter must result in a mass globular in form depressed at the poles and protruding at the equator. As the movement became more rapid a part of the mass at the equator was thrown off, as the result of centrifugal motion, to form itself into another but smaller globe which must pass through the same experience of the parent globe. One globe after another was thrown into space, until the parent mass had cooled sufficiently, and slowed somewhat in velocity so that what we know as centrifugal force was not sufficient to cause farther disruption. The remaining mass is known to us as the sun, the parts thrown off are the planets of which our earth is one. We have not space to more than take a momentary view of the universe as it must have appeared at this time. There was the great central mass of incandescent vapor, the sun rotating as now. Around it, in ever increasing circles, move the planets themselves—masses of vapor, some of which had thrown off secondary globes or moons. The smaller planets and those which had been thrown off first were necessarily cooler than the others, they were solid and less incandescent. Such is the condition in which we see our own earth, a mass of hot vapor with a moon moving around it in ever increasing circles until, probably long after our earth had become solid and many strata of rock had been deposited upon it, it reached its present distance.

Moving through space our earth cooled until there was a thin surface of rock entirely covering it. This rock is known as igneous or plutonic rock. At this time there was no water upon the surface, the moisture being suspended in clouds above it. As the earth became cooler the clouds were precipitated and covered the earth with a continuous sheet of water. Again the earth cooled, and in cooling contracted in the center, which contraction necessitated an upheaval of a part of the then thin surface rock. This rock which was raised above the face of the waters is what we know as our granite rocks. They then formed a line of low hills extending in across what is now Canada, and forming inlands here and there, south and perhaps north of that line. Under the water the granite still remained and formed the bed-rock upon which all other subsequent rock was deposited. Thus we see that this nebular hypothesis explains our incandescent sun, the nebulae or floating clouds we see at night among the stars, the unfinished condition of some of the planets, as well as the interior heat of our earth, and the formation of our igneous rock, which differs so much from later or stratified rock. It explains all the phenomena of our earth previous to the time when she began writing her own history. After we recognize how the first rock was raised above the surface of the water progress is comparatively easy. Later rocks are formed from the fragments of earlier rocks, deposited a layer at a time and hardened.

BUFFALO COMMITTEE MEETING.

A meeting of the committee of the National Marble and Granite Manufacturers' and Dealers' Association of the United States of America and Canade was held at Buffalo, N. Y., Aug. 28, 1888.

The following members of the committee appointed by the National Association at Cleveland, O., July 12, for the purpose of revising and changing the constitution and by-laws, met at the Tift House, Buffalo, N. Y., Aug 28: James Sharkey and Samuel Cocroft, of Brooklyn, N. Y.; F. C. Partridge, E. R. Morse and W. T. Ripley, from Vermont.; Vice-president, James Harsha, H. M. Woodard and H. D. Pierce, from Ohio. Delegates from Quincy, Mass, and Ontario were not present.

The by-laws were entirely stricken out, and the constitution materially changed and strengthened. Several new sections were added, among them being one of important bearing on the trade, reading as follows.

> "No state or local association shall be a member of this National Association whose constitution or by-laws admit to membership persons, firms or corporations who sell marble or granite both at wholesale and retail."

To defray the expenses of the National Association, a pro rata tax will be levied on all associations who are members.

The next meeting will be held at Buffalo, N. Y., the first Tuesday in August, 1889.

The following officers were elected:

President—James Harsha, Ohio.

Vice-presidents—J. H. Brennan, New Hampshire; D. W. Paul, Indiana; Thomas Pitbladdo, New York; Thomas M. Staniland, Ohio.

Secretary and Treasurer—H. D. Pierce, Ohio.

An executive committee will soon be appointed, which will have general oversight over the affairs of the association.

Full particulars of the meeting, with all changes made in constitution, will appear in our next issue.

At a recent civil service examination for an inspectorship of masonry, the applicant was asked: "What is the best method of making cement mortar?" He replied: "I'd mix the cemint and wather foirst, an' thin put in th' hydra-aulic." From a distant seat a voice: "He manes th' hydrint, I'm thinkin."

OUR ILLUSTRATION.

HEREWITH we submit another design for the Indiana State Soldiers' and Sailors' Monument. It is that of E. S. Jennison & Co., Chicago, Ill. We do not presume that the authors of this design had in mind to submit it as something of artistic merit. To us it is a curiosity and is given to our readers as such. Below we give extracts of what the authors had to say for it in their descriptive matter which accompanied the design to the commissioners:

This design for the Indiana Soldiers' and Sailors' Monument, consists of a spiral tower, diminishing practically to a point at the height of 324 feet above the level grade at entrance.

The interior consists of a single hall of an average diameter of 68 feet and 110 feet high, whose ceiling follows the contour of the exterior, so as to form a spiral dome.

Around this hall runs an inclosed ascending corridor, of which the greater part is composed of landings, as a reference to the drawings will show, the ascent being made only two feet at a time by four 6-inch risers.

The methods of construction is due to two flights of stone stairs, the one 16 feet above the other, diminishing in width as they go up, and ascending spirally on the lines of a decreasing volute or scroll.

The upper stair is entirely open to the weather, and forms a point of outlook over the city and the surrounding country. It is guarded by a stone parapet around the outer edge.

The lower stair forms the floor of the corridor and is provided with means of outlook through massive sheets of plate glass, which are also intended to receive inscriptions. On the inner side of the corridor next the hall, through large elliptical openings at every landing, a view is afforded of the hall and of the fresco on its vaulted ceiling.

The distribution of the risers and treads and platforms in the stairs, and the diminishing of these in width, are so arranged that one turn of the two stairs around the shaft, puts them as much nearer the center, as to bring the outer string above the inner string of the flight below, and the whole system finally incloses the hall shown.

This mechanical rule gives a broad base with proportionately massive detail. Every part of the structure decreases in its horizontal dimensions as it ascends.

The openings on the outside of the lower stair will be closed with sheets of plate glass, standing on the inside of the columns. The plate in the lowest opening will be ⅝ inches thick, and the other plates would diminish to the ordinary thickness at the top. These will be set in brass frames and made immovable.

The upper, or outside, flight of steps would be for ascent, and the lower for descent, when a crowd was to be accommodated. The first forms only an outlook whilst the latter forms also a gallery to the interior from which historical frescoes might be closely studied.

No statuary is offered in this study; that is left to the future; there are so many places where it could be made to add to the interior.

Any work of the sculptor, protected as it would be, in the interior, would remain for all time in its finest detail. The floor of the hall would be paved with marble. The wainscoting in the hall to be of polished granite.

Woman (to tramp)—I kin give you a piece of dried apple pie for breakfast. Tramp—Madam, I only eat pie at breakfast in cases of the direst necessity; but if I should eat dried apple pie in July I would feel that I were flying in the face of a bountiful nature. I will try and break bread further on.—*New York Sun.*

GEORGIA MARBLE.

To give an idea of the magnitude of the marble business in Georgia, the Georgia Marble Company has already expended in its enterprise a total of $575,426.54, as shown by their books and reports at the annual meeting of their stockholders at the Atlanta office of the company. There were present some of the largest holders of the stock, including Messrs. Willoughby, Hill, Hoffman, Clement and Bane, of Chicago; Mr. Frank Siddall, of Philadelphia, and Mr. Paul West, of Boston, the latter gentleman representing 2,600 shares of stock owned by the Boston capitalists. Among the improvements for the past year is a twenty-four gang mill, with all modern appliances, costing $75,000, and over $100,000 expended in railroads, buildings and machinery, besides the mill. Four quarries have already been opened, all varying in color from pure white to nearly black. One of the quarries, the Creole, yields a very dark mottled marble, with a white ground, and very dark blue, almost black, mottling, giving a very rich and beautiful effect. Another, the Cherokee, produces white marble, with clouds of dark blue, and bluish gray with dark spots. Another the Etowah, yields a rich, high colored marble, with pink, salmon and rose tints varied with dark green shades in indefinite variety. For mantles, table tops, panels and transoms it is of surpassing beauty. Another quarry, the Kennesaw, yields a pure white, and being crystalline like that of the other quarries, it is precisely like the ancient Parian; so celebrated among the Greeks for sculpture. This marble is perfectly non-absorbtive. You may cover it with grease, with kerosene, with ink, with oil of any kind or with tobacco juice, and wash it with perfect ease, as white and pure as ever. You may soak a cube of it in water without the increase of a single grain in weight. It requires from ten thousand to twelve thousand pounds to the square inch to crush it. Very few of the best granites will stand such a pressure, while most building stones will crush at from three thousand to eight thousand pounds to the square inch. These qualities give it a durability beyond any other known marble, if not beyond any other building stone, while its non-absorbing qualities will make it most desirable for toilet tables, meat market and fish counters, drug stores, soda fountains and all places where liquid and oily matters of any kind come in contact with the surface. For tiles for floors in public buildings it will wear longer than any other marble, while for all inside finish of elegant buildings its beauty cannot be excelled. The Georgia Marble Company owns or controls seven thousand acres, nearly all underlaid with these beautiful marbles, so that the quarries are absolutely inexhaustible. It would take a thousand years, with a thousand men and the best possible machinery, to make much impression on it. It is not too much to say that as soon as its superior qualities become known it will be used in preference to Italian or any other marble, or to predict for Georgia marble a grand and brilliant future.—*The Tradesman.*

CRYSTALLINE ROCK FORMATION.

Granites and other rocks which have been deposited on the surface of the earth at different periods of her history show differences in their crystallization which is only to be discovered through microscopic analysis. It is suggested that in time the mineralogist will be able to tell the age of a granite or other crystalline rock by the character of the crystals in the same manner that the paleontologist fixes the age of stratified rocks by the fossils contained in them.

"Your journal is complete in all details and takes the lead."—Hoadley Bros., Gosport, Ind.

CALIFORNIA STONE.

To a newcomer in the Santa Clara valley there is nothing more surprising than its wonderful resources, except the fact that the knowledge of this substantial growth and prosperity has been confined to a few people, and the fame to which it is justly entitled extends over a small section of country. Our neighbors in adjoining counties know little of the wells of natural gas in the canyons, the capacity of our big fruit drier, the flow of our oil wells and the long pipe-lines that run to Hueneme and San Buenaventura, from which oil is run onto vessels owned by the oil company.; and we scarcely realize ourselves the extent and value of the brownstone in the Sespe. The light of this part of Ventura county at least has been hid under a bushel, and the bushel itself has in some instances been hid. A week or two ago we set out on a voyage of discovery to see the country in general and, if possible, the scenery of the Sespe canyon in particular. Uncertain about the road we were on, and making inquiry of a small boy as to where it led, he replied:

"This one will take you to the brownstone quarries; if you want to go to the oil wells, turn to the right."

Brownstone quarries were something new in this wonderland of curious things; something we had not heard of in our brief residence in the valley, and inspired by both curiosity and interest to know more of them, we drove on. Entering the little valley that leads to the canyon, we pass fine farms on the hillsides and mesas, surrounded by orange, lemon and other fruit orchards, fields of barley cut and lying in golden heaps on the ground, large bee ranches with hundreds of white stands full of the busy workers. The road winds along the Sespe river, a noisy and rapid stream, rushing and tumbling over rocks and bowlders. It is circumspect enough at this season, though the width of its bed shows that in winter, when rains are frequent, it may burst its banks and widen into a fierce torrent. The canyon narrows, and mountains tower to the clouds on both sides, covered with a thick growth of wild flowers and fragrant chaparrel. Groves of shapely live oaks line the sheltered places on the hills, their glossy leaves shimmering in the afternoon sun. The road crosses the river, and walls of stone come into view. As we go near the quarries they stand in towers and abutments, like the bastion and ramparts of a mighty fortress. It is Sunday, and the workmen's tools are idle, but here are huge blocks of stone hewn and shaped ready for shipment. Great piles of it lie around everywhere in all sizes, waiting for the hands of the builder. There is stone enough to build the pyramids of Egypt, the great wall of China, and construct a world besides. It is of a rich brown color, and in that and its texture closely resembles the noted brownstone of Nova Scotia, so highly valued in the New England states. This Sespe brownstone, we have since learned, has been tried by all the tests known to geologists, and is pronounced the finest quality known. It has been subjected to a white heat, dropped into water, and instead of crumbling, as other building stones have done in large fires, turns to granite. It is easily mined, and when a railroad is built into the canyon it can be sent anywhere. Shipped to the seaports, it can be loaded on to vessels as ballast. The handsomest buildings in Los Angeles are trimmed with Sespe brownstone, and it will not be long until it will enter into the construction of the finest buildings in Southern California. The quarries are owned by a company composed in part of Santa Paula capitalists. The river at the quarries is both deep and swift; it rushes and plunges over huge bowlders that extend across the stream, effectually blocking the road farther up the canyon. On the opposite side of the river, in contrast with the brownstone, stands immense rocks of light gray sandstone, washed by the water into smooth and symmetrical shapes. Beyond the brown cliffs, the white wall and clear noisy river, the majestic mountains rise peak after peak, stately and sublime in their strength and grandeur, as far as the eye could reach. The descending sun decks their tall tops with a crown of shining gold, and curtains the distant ranges with a haze of purple and rose and gray like a veil of finest gauze. We turn our faces homeward feeling that the Sespe, like a bountiful and benevolent mother, holds in her heart a wealth of untold riches, while her face is adorned with noble and indescribable beauty.—*Santa Paula Chronicle.*

SOAPSTONE.

The mineral soapstone, or steatite, is just now coming into prominence by reason of the valuable property it possesses as a pigment for protecting steel vessels against corrosion. This characteristic was recently referred to in our correspondence columns, and it may be interesting to briefly notice this mineral and the many uses to which it is put.

Soapstone is a soft magnesian mineral found frequently in small contemporaneous veins that traverse serpentine in all directions. It is used in the manufacture of porcelain to make the biscuit semi-transparent. It is employed in polishing marble and glass for mirrors, and in numerous other directions in the arts and manufactures.

In China soapstone is used as the material for idols and other figures which form the household gods of the Celestials. Hence, it has been termed figure stone. Its refractory nature lends itself to the manufacture of gas burners and for use in furnaces. It is also used in the manufacture of crucibles.

Its latest application, however, is that of a paint for protecting the insides of iron and steel ships and other structures, which difficult problem it is stated to have been the means of solving. Besides the purposes to which we have already alluded, soapstone is also largely used in China for preserving structures built of sandstone and other stones which are liable to disintegrate under atmospheric influences, and we are told that the covering of powdered soapstone in the form of paint on some obelisks in China, which were hewn out of stone liable to suffer under atmospheric influences, has been known to preserve the same intact for hundreds of years

Soapstone may therefore be said to have extraordinary qualities in withstanding atmospheric influences, which have a great deal to do with the corrosion of steel and iron, for the inside of a steamer, which, athough not exposed to the incessant action of salt water, like the bottom, corrodes much more quickly than the outside.

Soapstone has, however, another quality which eminently adapts it as a pigment for protective paints, and that is the extreme fineness of its grain, as every one who has handled this stone is aware. Ground soapstone is one of the finest materials which can be produced, and from the experiments which have been made by Messrs. Holzapfel & Co., of Quayside, Newcastle-on-Tyne, it is found that nothing takes hold of the fiber of iron and steel so easily and firmly as soapstone. It is, moreover, lighter than metallic pigments, and is said to cover a larger surface than either zinc white, red lead or oxide of iron.

The soapstone is mixed with a quick-drying varnish of great tenacity and hardness, producing a paint of great covering capacity and firmness, presenting an enameled surface of a bright red color. In employing soapstone as a pigment for paint, Messrs. Holzapfel employ practically an imperishable article. Soapstone is neither affected by heat, by atmospheric influences, nor by ordinary acids, and will, consequently, be a great improvement on the pigments employed in paints so far. Oxide, lead and zinc, mixed with oil, turpentine and driers, are usually employed in painting the inside of vessels, as well as bridges and all iron or steel structures which are liable to corrode. All these pigments undergo changes through being exposed to the atmosphere, and are easily dissolved in acids, and can consequently only last for a limited period. For steel structures particularly these oil paints as a rule offer sufficient adhesive properties to protect the steel against atmospheric influences effectually, on account of the smooth surface and fine grain of the steel. As a strongly adhesive, hard-setting varnish is employed in the present case, soapstone composition may be considered a distinct advance on the present method of painting. The soapstone composition will also preserve woodwork from rotting and sandstone from decay; it will render walls damp proof, and will, we believe, be found a cheap and efficient substitute for all ordinary paints.—*Iron.*

AN IMMENSE CONCERN.

Northern Ohio has long been renowned for the superior quality of sandstone it produces. The Cleveland Stone Co. are the largest producers of sandstone in this country. Their quarries and extensive plant cover a large area, extending over the most of the western portion of Lorain and Cuyahoga counties, which lie adjacent to each other and to the shores of Lake Erie. In addition to their interests in Ohio, they carry on extensive operations in Indiana, Michigan, New Hampshire and Massachusetts. Their Ohio quarries produce the famous buff and blue Amherst and Berea sandstones which have been used in many of the notable buildings in the United States and Canada. They obtain from their Indiana quarries what is known as Bedford limestone, and from their Michigan quarries the well-known Huron grindstones.

Their Eastern quarries supply the far-famed blue scythe-stones of superior grit and finish. Owing to the great amount of business transacted, and the usual rush experienced in this line of trade in the quarrying season, they have found it necessary to have have direct communication with their different works, and have connected them with their general office by telegraph and telephone lines of their own construction.

They produce in the neighborhood of 3,000,000 cubic feet of stone per annum. They employ about 2,500 men. From 30,000 to 40,000 tons of grindstones—large and small—are turned out every season. The quarries are equipped with the best of the most modern quarrying appliances. Their building stone is shipped from Maine to California, and from New Orleans to Winnipeg, and they export large quantities of grindstones and scythestones. These quarries were opened in a crude way about seventy-five years ago. The superior quality of this stone for grinding purposes, its beautiful color, uniformity of texture and grain its exceeding strength and durability, accompanied by the most persistent energy and enterprise on the part of the managers, has won far the Ohio stone a reputation second to none in the world.

The present procucing capacity ot the quarries is two hundred and fifty car loads per day. Additions and facilities in the way of machinery, derricks, etc., are being put in daily in order to equip the quarries with proper means for producing the stone as rapidly as the demand requires.

The quarries run from about the first of April to the first of November, being closed during the winter months, as all otner sandstone quaries are.

Fat man—What costume shall I wear to the masquerade ball?

Cynical friend—Don't wear any costume. Tie a string to your ankle and go as a captive balloon.—*Texas Siftings.*

STONES OF DIFFERENT STATES.

THE wide variety of stone found in Kansas deserves more than passing mention, on account of the number of geological ages exposed in this one state. In Southeastern Kansas there occurs a small exposure of subcarboniferous rock. It is in this formation that the lead mines of Kansas occur. In southeastern Kansas are found also exposures of the lower coal measures. Here are found some thick and valuable coal beds as well as limestone, which is valuable for building purposes and flagging. The middle coal measures also show good beds of coal, and limestone beds of some thickness. In Greenwood are found outcrops of sandstone. The upper coal measures show beds of both lime and sandstone, but as yet they have not been found valuable for working. The exposures of permian show a drab-blue shade with an occasional strata of limestone. Whether found in Northern, Central or Southern Kansas, the color is always drabable or a buff, and the character the same. The stone is rather soft, much softer than that obtained from the subcarboniferous rock, and at the same time durable. For this reason it is much sought after for building purposes and quarries have been opened along the railway.

* * *

The state of Nevada has quarried some stone in the prison yards at Canon City by convict labor. The stone is a very coarse sand, and contains fossils of both mollusks and vertebrate animals; also tracks of some animal with three toes like a bird, very plain in the surface of the stone which forms the floor of the prison yard. The tracks are 11 inches long from heel to toe, and are 22 inches apart. The United States mint at Carson, the city hall and county buildings are all built of this stone, and some was taken to Reno to form a portion of the walls of the state prison. The Carson sandstone is not fit for steps, floors or any place where there is much wear, as it is coarse grained and soft, and in such positions has to be replaced often. It also absorbs a large quantity of water, making it unfit for foundations or places where it is likely to be exposed to moisture.—*United States Geological Report.*

* * *

The amount of stone in Wisconsin is little recognized even in that state, to say nothing of other sections of the country. The north central portion of the state is covered with archæn rock, which as well as all other portions of the state is well overlaid with drift. There are many exposures which could be worked profitably. Around this archæn rock is found the silurian, which rock has hitherto formed almost the only building stone which has been quarried in that state. It is said in thickly settled portions of the state, which curiously enough almost corresponds with the silurian exposure, there is hardly a town or settlement which could not quarry stone in its immediate vicinity. There are some places where the depth of the drift would forbid this, but almost every town could have quarries large enough to supply their own building needs.

* * *

The only upper silurian formation in Wisconsin which furnishes building stone is that known as the Niagara limestone. It is these beds which furnish the best stone in the state, and they are the only ones where the rock occurs to a sufficient deph to encourage the investment of large sums of money for their development. The other beds are shallow and could only be of local importance. The Niagara limestone is found in a strip along Lake Michigan. The stone which is quarried around Milwaukee is typical of the group, and much fine stone can be taken from these quarries as well as that which is not suitable for the best building purposes.

COLORADO STONE REPORT.

IT is always interesting to notice the procedure of the building committee of any large structure. Recent years have developed considerable intelligence in matters of this kind. The report of the Denver Society of Civil Engineers to the Colorado Board of Capitol Managers is of interest. In reading it, it should be borne in mind that it is the purpose of these engineers to instruct as well as to lay definite facts before the commission. The matter in hand is voluminous, and we cannot be expected to make more than a few extracts from the body of the report. There may not be a great deal in it that is new to the quarryman, but it will serve to indicate the proceedings of a committee having work of this kind in hand:

Solidity and durability are the most essential properties of a good building stone. The ancients taught us to pay scrupulous attention to the choice of building material. Despite their poor facilities for transportation, distance was not considered by them a sufficient reason for rejecting those stones which were recognized as capable of withstanding the effects of time. In ancient edifices and monuments which still exist, such as the monument of Carnac, in France; the famous Stone Henge, in England, the Bouroo Boodor, in Java, and others elsewhere, durability was the main object sought for. Architecture and decoration require, however, other properties. Not only are those stones rejected which crumble by exposure or crack by frost, but a fine and uniform grain is desirable; the stones must be easily cut, resist the blow of the hammer and endure heat without cracking; in short, they should possess all the properties requisite to give to buildings a permanent solidity and a pleasing and imposing aspect.

Limestones, granites, sandstones and lavas are the principal stones used in architecture. Limestone effervesces with acids, chages into quicklime by calcination, and is readily cut and polished. These last named properties, together with the fact that limestone occurs generally in thick layers, easily separated, have always brought it into great demand Limestone does not resist the destructive action of rain, frost and great heat as well as granite, lavas and many sandstones. When quarried, it is generally softer than after exposure to air for some time. This is due to the moisture which it contains in the quarry, and which it loses only on long exposure. It should, therefore, not be dressed for building purposes until it has lost this moisture, or quarry water; otherwise it is liable to crack by frost. Many limestones contain fossils; this does not affect the cohesion of the mass, but causes the coler to change soon to a somber gray on account of the many cavities, which allow the accumulation of dust and growth of lichens.

Of the different products of volcanoes two kind can be used for building purposes, the semi-porous (not scorified) lava and the volcanic tufa. These have generally a low specific gravity, and are on that account desirable for arches, vaults, etc.

Basalt, a variety of compact lava, is too hard to be cut and dressed. The semi-porous lavas are more easily worked, and both on account of their composition (which is anomalous with puzzolano and hydraulic cements), and their numerous cavities, they unite firmly and form a solid structure with mortar. Lavas are very useful in irregular or partly dressed blocks to serve as foundations.

Tufa is a volcanic ash, or sand, firmly held together by an argillaceous or ferruginous cement. It occurs generally in layers or beds, and is readily quarried. It is extensively used in Italy.

Sandstone consists of grains of sand held firmly together by some cement. It occurs in layers of strata of varying thickness and hardness. It is sometimes coarse and sometimes fine grained, and is easily quarried. It is dressed with little expense, though not so readily as limestone, and cannot be polished. Dark-colored limestones are found to be generally harder than the light-colored ones, but the reverse is true of sandstones. The light-colored sandstones possess generally the greatest hardness and solidity, have fewer cracks and fissures, and are finer grained and less friable than the red and brown sandstones. Sandstone is the principal building stone of Germany and Spain.

The testing of building stones is naturally divided in experiments on their solidity and on their durability. To ascertain the solidity of a stone the weight per cubic foot must be known, and its strength, or in other words, the resistance it can oppose to crushing pressure. General Q. A. Gilmore found that the crushing force required for granite was 8,000 to 24,000 pounds per square inch; for good lime stones, 3,000 to 20,000 pounds per square inch; for superior sandstones, 4,000 to 12,000 pounds square inch.

The physical action of water on stones is one of wearing. The rainwater softens many a sandstone, and wind hurling rain-drops against the sides, particles are loosened and crumble off. It the stone, when wet, is exposed to a temperature below freezing point, the expansion of the freezing water will wedge the particles of stone apart. Thus, the greater the amount of moisture absorbed by a stone, and the smaller the pores of the same, the greater will be the disintegrating effect of frost on the stone. Some stratified rocks contain a considerable amount of clay, and this substance, absorbing more or less moisture than the other constituents, exfoliation by frost will follow. Clay is, therefore, a dangerous ingredient of building material.

We cannot end this report without making two suggestions. In the first place, we would recommend a visit to the quarries whence the specimens came which attract the most attention for their excellence, in order to ascertain if the bed from which these specimens were taken has sufficient extent to produce all the stone necessary for a structure of so vast dimensions as the capitol building will have. Often it happens that stones coming out of the same quarry have different properties in regard to weathering. The color may also differ considerably at different parts of the quarry. A thorough study of the outcrops and of pieces which have been exposed to the influences of rain and frost during many seasons, is essential.

Second, we would recommend when a selection is made, that the stone blocks be quarried long before they are dressed and placed in the building. Lime and and sandstones require seasoning as well as lumber When these stones, principally those having small pores, are dressed before they are slowly freed of their quarry water in the shade, and are thus exposed to the hot sun, the moisture in the stone will suddenly expand and cause the stone to shale off and form fine cracks near the surface. Frost will have the same disintegrating effect on otherwise excellent and durable stones. When stones are once thoroughly dry, the best means of preservation is to prevent the intrusion of water by closing the pores on the exposed surface. The pores of granites and limestones can be best closed by giving these stones a polish. Sandstones will be best preserved and can be polished when their surfaces are treated with a solution, filling their pores with a silicate of alumina, as, for instance, is done in the quarries of Saxonia, in Nuendorf, near Pirna. Such preservations not only prevent moisture entering the stone, but prevent dust settling in the pores and also the formation of lichens, which not only give an ugly appearance to the stone, but accelerate the disintegration.

The following is from the general instruction to contractors, and is made part of the specifications:

Contractors will submit samples of stone to be used, designating the quarry from which said samples are taken, and they will be held responsible that the quarries from which said samples were taken are of sufficient capacity to furnish the stone of the several sizes required in the construction of the building; and should said contractor or quarries fail to supply the stone of the character, grade, or texture, then, in the event of such failure, the Board of Capitol Managers may, if they deem best, designate any other quarry or place from which stone may be taken; but such designation by the Board shall not be construed to hold them or the state of Colorado in anywise responsible for the character and qualities or quantities of the same. But no stone will be accepted of inferior grade or quality to samples deposited in the office of the Board from such quarry. Dressed samples of six (6) inch cubes must be submitted with the proposal, and marked with the name of the bidder and quarry.

Norcross Brothers, of Worcester, Mass., have given the Flynt Granite Company of Monson, Mass., an order for 1,800 carloads of stone, which will be used at the new depot in Worcester. This is the largest order the Flynt Company ever received at one time, and they are now shipping about twenty-five careloads a day.

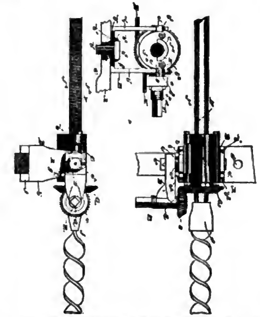
It is estimated that $30,000 worth of diamonds are used every year in the cutting machines in Rutland, Vt., and vicinity. A single diamond drill often contains stones valued at $250.

Sheldon & Sons, of Rutland, Vt., now use at their works eight boilers, employ 450 men and cannot fill their orders as fast as received.

REGENT PATENTS.

ISSUE OF JULY 31, 1888.

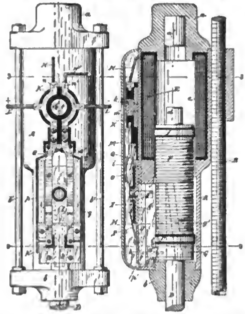
No. 387,096—Rock-Drill. Nathaniel Miller and John Ritchie, What Cheer, Iowa. Filed Feb. 14, 1888.



CLAIM.—1. In a rock-drill, the combination of the bracket having the bearing-notches, the feed-screw sleeve having the trunnions in said notches, and the arm D, detachably secured to the extended squared end of one of the trunnions, having the sleeve for the drive-shaft, substantially as specified.

2. In a rock-drill, the combination of the grip-arm, the bracket pivoted thereon, the feed-screw sleeve having the trunnions journaled in the brackets, the arm detachably secured to one of the said trunnions and having the right-angled sleeve, the drive-shaft journaled in said sleeve, and the gear-wheel fitted on said shaft, the feed-screw flattened on opposite sides, and the gear-wheel fitted on said screw and meshing with the gear-wheel on the drive-shaft, substantially as specified.

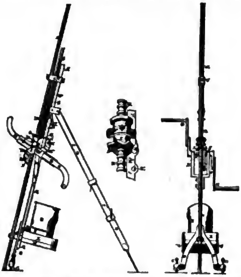
No. 387,160—Electric Rock-Drill. George Guns, Wilkes-Barre, Pa. Filed June 30, 1887.



CLAIM.—In an electric rock-drill, the combination, with a solenoid-helix, of an armature provided with a coil, one of the said elements being stationary and having its current constant in one direction and the other element having its current reversible at each end of its stroke, a connection-piece at each end of the armature-coil, a metallic surface inside the solenoid-helix in constant contact with one of the said pieces, a strip of metal in constant contact with the other piece, and a commutator for reversing current of the reciprocating element at each end of its stroke.

No. 387,127—Rock-Drill. William Weaver, Phoenixville, Pa. Filed June 15, 1887.

CLAIM.—1. The combination of the drill-rod with the ratchet-nut having the opening for the drill-rod made eccentrically through it, so that teeth of the nut can be longer upon one side than the other and thus rotate the drill-bar irregularly, substantially as set forth.

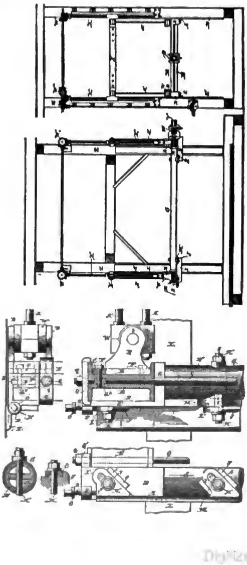


ISSUE OF AUG. 7, 1888.

No. 387,221—Composition for Building Stone. Albert Farst and Rudolph Schaufelberger, Denver, Colo. Filed Oct. 14, 1887.

CLAIM.—The herein described composition for building stone, consisting of powdered slag and plaster of paris, as set forth.

No. 387,299—Gang for Sawing Stone. James W. Maloy, Marietta, Ga. Filed Sept. 5, 1887.

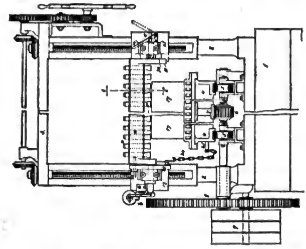


CLAIM.—1. In a reciprocating saw-carrying frame, the combination, with the tabular side bars and end bars, E, of corner connecting-pieces secured to the end bars, and having hollow cylindrical portions D', provided with transverse strengthening ribs d^3, adapted to extend into the ends of the tabular side pipes, bolts passing through the side pieces and the hollow cylindrical portions D', thereby uniting them, substantially as described.

2. In a reciprocating saw-carrying frame, the combination, with the side bars and the end bars, consisting at each end of two bars E E, of corner connecting pieces secured to the side bars and having seat portions D, which receive the end bars, which are separated by a web portion, d^2, of part D, a plate C, carrying journals for the suspension links resting upon the upper end bar, and through-bolts F, uniting the plate C, the bars E, and part d^3 of the corner connecting piece, substantially as described.

3. In combination with the swinging saw-carrying frame of a stone-sawing machine, a bearing-plate, I, adjustably secured thereto and having inclined edges i, and inclined projections carried by the frame, and against which the edges i of the bearing plate rest, whereby it is maintained in line with the motion of the frame at different adjustments, substantially as described.

No. 387,341.—Machinery for Planing and Dressing Stone. James Coulter, Batley, County of York, England. Filed May 5, 1887. Patented in England July 2, 1886. No. 6,026.



CLAIM.—1. In a stone-dressing machine, a reciprocating bed which carries the stone to be dressed in combination with a laterally adjustable tool holder mounted above said reciprocating bed, which holder holds the cutting to is in a stationary position while the same are operating upon the stone, and said having sliding journals which slide in their bearings and means for moving said holder laterally when the cutting tools are not operating upon the stone, substantially as set forth.

2. In a stone-dressing machine, a reciprocating bed which carries the stone to be dressed, in combination with an oscillating and laterally-adjustable tool-holder mounted crosswise of said reciprocating bed, the bearings for said tool-holder, said tool-holder having sliding journals which slide in said bearings, and an operating lever pivotally connected to one of said jounals and to said bearing, substantially as set forth.

3. In a stone-dressing machine, a reciprocating bed which carries the stone to be dressed, in combination with an oscillating tool-holder mounted crosswise of said reciprocating bed, the axis on which said holder oscillates being in a plane nearer to the surface of the bed than the cutting edges of the tools carried by the holder, substantially as set forth, whereby when the holder is oscillated the cutting edges of the tools will be lifted from the surface of the stone.

4. In a stone-dressing machine, a reciprocating bed which carries the stone to be dressed and an oscillating tool-holder journaled crosswise of the bed, in combination with a chain attached at opposite ends to said bed and said holder, substantially as set forth.

5. In a stone-dressing machine, a reciprocating bed which carries the stone to be dressed and an oscillating tool-holder journaled crosswise of said bed, in combination with a lever, 22, carried by said tool-holder and extending in the direction of the bed, and a chain attached at opposite ends to said lever and to said bed, substantially as set forth.

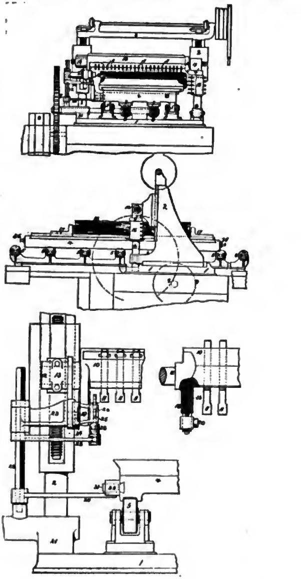
6. In a stone-dressing machine, a reciprocating bed which carries the stone to be dressed and an oscillating tool-holder journaled crosswise of said bed, said holder carrying a single set of tools which dress the stone during both movements of the bed, in combination with a fixed stop, 20, having oppositely-inclined faces, and an arm, 18, on the tool-holder, which encounters said stop on one face, the holder itself encountering the other face of the stop, substantially as set forth, whereby the tools are presented to the stone at the proper angle during both movements of the bed.

No. 387,342.—Stone-Dressing Machine. James Coulter, Batley, County of York, England. Filed Oct. 6, 1887. Patented in England Nov. 1, 1887. No. 14,851.

CLAIM.—1. In a stone-dressing machine, a reciprocating table which carries the stone to be dressed, in combination with an oscillating tool-holder journaled crosswise of said table, a second oscillating tool-holder at right angles to the first holdes and perpendicular to the plane of the surface of the table, both of said tool-holders remaining stationary and immovable while the cutting tools fixed thereto are operating upon the stone, and gearing intermediate between said holders, substantially as set forth, whereby the oscillation of one effects also the oscillation of the other holder.

2. In a stone-dressing machine, a reciprocating table which carries the stone to be dressed, in combination with an oscillating tool-holder journaled crosswise of said table a second oscillating tool holder at right angles to the first holder and perpendicular to the plane of the surface of the table, both of said tool-holders remaining stationary and immovable while the cutting tools fixed thereto are operating upon the stone, gearing intermediate between said holders, substantially as set forth, whereby the oscillation of one also effects the oscillation of the other, and means for automatically oscillating said tool-holders when the reciprocating table reaches its limit of travel in each direction.

3. In a stone-dressing machin, a reciprocating table which carries the stone to be dressed, and an oscillating tool-holder journaled crosswise of said table, in combination with the longitudinally-sliding bar 25, with which said holder is connected, the rock-shaft 22, levers connecting said shaft with said sliding bar, the lever-arms 30, carried by said shaft, and dogs or tapets 32 on said reciprocating table, which encounter said lever-arm, substantially as set forth.



4. In a stone-dressing machine, the oscillating tool-holder and the longitudinally-sliding bar 25, having a perpendicular slot therein, in combination with the arm 19, connected with said holder, said arm having a projection, 20, which enters said slot, substantially as set forth.

5. In a stone-dressing machine, the oscillating tool-holder having arm 19, and a spring-actuated sliding block to said arm, in combination with the fixed curved track or dish 34, against which said block bears, substantially as set forth, whereby vibrations of the holder are prevented.

6. In a stone-dressing machine, a reciprocating table having a laterally-movable bed-plate upon which the stone is placed, a rock-shaft journaled in said table beneath said bed-plate, racks carried on the under side of said bed-plate, and pinions on said shaft, which engage said racks, in combination with a tool-holder mounted crosswise of and above said reciprocating table, and a series of cutting tools carried by said holder, which act simultaneously upon the stone on said bed-plate.

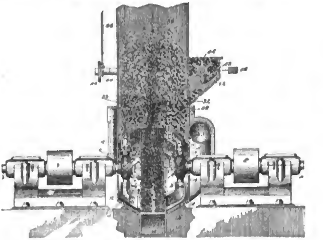
No. 387,344.—Artificial Stone. Andrew G. Dickinson, New York, N. Y. Filed June 12, 1888.

CLAIM.—A composition of matter to form an artificial stone, consisting of cement, alkali in solution, silica, crushed stone or gravel, muriate of soda, caoutchouc or rosin, and glue and gallic acid, substantially as set forth.

No. 387,519.—Artificial Stone. James T. Key, Blackburn, La. Filed May 21, 1888.

CLAIM.—An artificial stone composed of Portland cement, sand, plaster of paris, alum table-salt and rice, in or about in the proportion specified.

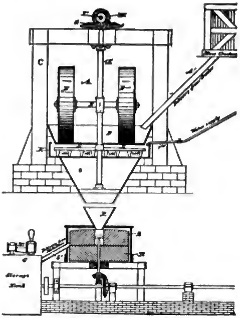
No. 387,530—Reducing Machine. George Raymond and Albert Raymond, Chicago, Ill., assignors to the Cyclone Pulverizer Company of the United States of America, New York, N. Y. Filed Dec. 30, 1886. Patented in England Jan. 26, 1887. No. 1,270.



CLAIM.—1. In a reducing machine, the combination of a circular chamber, two sets of beaters placed on each end of said chamber, and means for causing said beaters to revolve, the said beaters having between their inner revolving edges a clear space of a width equal approximately to one-third the length of the chamber, and the said chamber being provided with an upward discharge opening substantially equal in length to the entire length of the chamber, substantially as described.

6. In a reducing machine, the combination of a circular chamber having a larger diameter at its center than at its ends and provided with an upward discharge-opening, two sets of oppositely-revolving beaters, one set placed in each end of said chamber, means for causing said beaters to revolve, and two air-pipes leading into said circular chamber at its base, one at each end thereof and on opposite sides of the axes with respect to each other, substantially as described.

No. 387,568—Process of Manufacturing Hydraulic Cement. Charles R. Gostling, Whitehall, Pa. Filed Nov. 2, 1887.

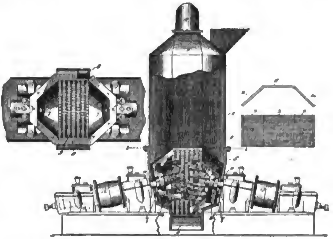


CLAIM.—An improvement in the art of manufacturing hydraulic cement, which consists in crushing and grinding the material of which the cement is composed, mixing the ground mass with water to reduce it to a plastic or semi-plastic condition, regrinding the plastic or semi-plastic mass to still further reduce it, and transferring this plastic body in mass into a suitable chamber to dry the same, after which it is burned and reduced to an impalpable powder, as set forth.

No. 387,598—Reducing Machine. George Raymond and Albert Raymond, Chicago, Ill., assignors to the Cyclone Pulverizer Company of the United States of America, New York, N. Y. Filed April 26, 1888.

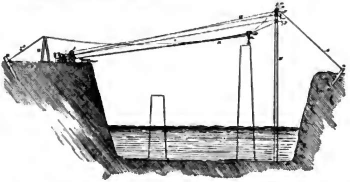
CLAIM.—1. In a reducing machine, in combination with the separating chamber, disks or heads mounted therein and provided with beaters arranged to operate close to the walls of said chamber, and with pins or spikes projecting from said heads, substantially as described.

2. In a reducing machine having an inclosed operating chamber, two oppositely-rotating shafts projecting into said chamber and downwardly inclined with reference to each other outwardly from the chamber, heads secured to said shaft and provided with beaters arranged to operate close to the walls of said chamber, and pins or spikes projecting from said heads, substantially as described.



ISSUE OF AUG. 14, 1888

No. 387,794—Apparatus for Transporting and Setting Stone. Donald McDonald, Louisville, Ky. Filed Dec. 21, 1887.



Claim.—1. In an apparatus substantially as described, the combination, with a mast suitably supported, whereby it may be adjusted or moved laterally at its upper end, of the cable G, having its end portions disposed around guides on said mast and having such end portions extended from the mast in opposite directions and at approximately right angles to the direction of the main portion of the cable, substantially as set forth.

2. The combination of a hoisting device, 3, a mast, B, suitably supported, whereby it may be adjusted or moved laterally at its upper end, and having guides $g\,g'$ at its upper end, and the cable G, passed around the drum of hoisting device 3, thence over the guides $g\,g'$, and having its ends extended laterally from the mast in opposite directions and anchored, substantially as set forth.

A large blast was made recently at Bolger quarry, at Hydeville, Vt. Twenty-four holes, three inches in diameter and each twenty feet in depth, were made. The rock which was blasted was triangular in shape, being fifteen feet on each side. The holes were drilled on the top of the quarry. From this top rock to the bottom of the quarry it is fifty feet. The blast was fired by electricity. The great mass of rock, thousands of tons, was thrown from its bed instantaneously into the pit of the quarry.

They were young lovers, and as they strolled under the trees on Water street, the future looked very bright and pleasant to them.

"That is a dogwood tree, my love," he said, touching it lightly with his stick.

"How do you know that is a dogwood tree, George dear?"

"I can tell by its bark, my darling," and then a policeman ordered them off the grass, and they were very, very happy.—*Lock Haven Democrat.*

The famous Chinese wall is said to have been erected about 300 B. C. In 1879 it was reported to be 1,728 miles long, 18 feet wide, 15 feet thick at the top.

MANUFACTURE OF GRINDSTONES IN EUROPE.

A long article in *Engineering* tells how grindstones are quarried and manufactured in Europe. An abstract of this article may not be without interest.

The special characteristics of a good grindstone are quick cutting, durability and homogeneity. The stone must occur in deposits remarkably solid and pure. It must also be entirely free from seams, veins, iron or fossils. Seams and veins are the two defects usually found in stones, and are the cause of many accidents through bursting when the grindstone, is running at high speed. Sandstone, and, in fact, all sandstones, are composed of grains of sand cemented together so as to form a solid rock. This cementing material is either silica, oxide of iron, carbonate of lime, or all three combined. The brownstone houses in New York are built of sandstone, which is largely composed of oxide of iron. In quarrying the stone great care must be taken to avoid threads and seams, also to avoid causing these defects through heavy blasting. Some quarries of stone do not blast at all—they simply channel the stone and wedge off large fragments, often weighing hundreds of tons. Other manufacturers quarry the stone by drilling holes 20 to 30 feet deep, and carefully gauging the amount of blasting powder so as to avoid undue shock to the pieces removed. A great many of the defects occurring in the stones are discovered when rough dressing, also a great many more when the stone is put in the lathe to be turned. Stones fresh from the quarry are more apt to split in working, therefore the rough dressed stones are kep. some time in stock before being turned.

Sometimes sound stones may be split, when attaching to the spindle by wedging, but such an occurrence is very rare, if the operation be performed in a mechanical manner. The best stones seem to lack grain. The texture is almost the same in both directions. Fossils also should be absent. A stone which carries small fossils, or bits of mineral like flint, or even deposits of iron, should be promptly rejected. A great many of the stones are cut into a cylindrical shape, 10, 12 to 20 feet long; by the next operation they are sawed into narrow sections, by saws such as are used here for cutting marble, the saws in this case, as well as in the marble, cutting by the action of water and sand, which are constantly suppled to them, When the stones are turned they are mounted on spindles much as they are when set up to work. The turning bar is of soft steel and applied in the ordinary way. In fact, turning a grindstone is much the same operation, whether performed in the quarry or in the machine shop. It may be interesting to know the elements contained in these stones, which is determined by the table herewith annexed, containing the analysis of two varieties of English stones:

	Brunton.	Wideopen
Silica	86 00	85 05
Alumina	8 10	8 00
Oxide iron	2 04	3 50
Lime	1 12	1 65
Magnesia	0 45	trace
Water and organic matter	1 83	1 70
Loss	0 46	0 10
Total	100 00	100 00

Mr. Einstetter (in the bosom of his family—"How mooch mine liddle Davit loaf he's father—heh?"

Little David—"Von hundert per cend. no disconnd, fast colors, mit exchanghe on London!"

Mr. Einstetter (in an agony of filial love)—"Ach! mein fader's own chrantson, say dot agains!"—*Kansas City Grocer.*

IT WOULDN'T BE FAIR.

She was a girl from Holly, N. J., and she had a mouth which attracted general attention. As she leaned against the railing and watched the breakers she suddenly exclaimed:

"O, James, but how grand! Seems as if I could open my mouth and take it all in!"

"But you won't, will you?" entreated a boy who stood by, "Ma and I have come 300 miles to see the ocean, and we don't want to lose it the first day!"—*Detroit Free Press.*

A HONEST MAN.

Pastor—"Well, Brother Johnson, have you been fishing again?"

Johnson—"Yes, sir, and had good luck, as usual."

Pastor—"I m glad to hear that, Brother Johnson. I hope you haven't acquired the bad habit of fishermen."

Johnson—"You mean lying? No, no, Mr. Goody. You see I'm always so busy pulling in six and eight pounders that really I don't have time to think up a lie that I would be caught in as soon as I told it."—*Washington Critic.*

ANOTHER VILE PLOT.

First burglar (at Atlantic City)—"I wonder if there is any more money in that postoffice yit?"

Second burglar—"Guess not; there hain't been time for funds to accumulate since we cleaned it out last week."

"Well we've got ter do somethin' for a livin'; can't lay around idle."

"I'll tell you what we'll do. We'll kidnap the perlice an' hold 'em for a ransom."—*Philadelphia Record.*

LUCKY LITTLE BOYS.

Minister—My boy, I have lived sixty-five years, and have never used tobacco in any form, nor told a lie, nor swore, nor played, hookey, nor—

Tommy—Have you got any little boys?

Minister—No, I have never had any little boys?

Tommy—Well, they're mighty lucky.—*Drake's Magazine.*

NOT QUITE SURE OF HIMSELF.

Magistrate (to witness)—You do solemnly swear, Uncle 'Rastus, that the evidence you are about to give shall be the truth, the whole truth, and nothing but the truth?

Witness—Ye-es, yo' Honah; but cuddent yo' swa' me on a smaller Bible? De siz ob dat book, sah, makes de old man nervous, 'deed it do.—*New York Sun.*

HARD TO OPEN.

"What in the world, John," asked his wife, "what did you open that can of tomatoes with?"

"Can-opener, of course," he growled; "what do you s'pose I opened it with?"

"I thought from the language you used, you were opening it with prayer.—*Life.*

"Vat," said the collector for a little German band to a citizen who sat in his front window, "you no gif noddings for dot mousic?"

"Not a cent!" replied the citizen, with hopeless emphasis.

"Den ve blay some more, dat's all!" threatened the collector, so the citizen hastily gave up a quarter.

"O, my!" exclaimed a New Jersey girl who was visiting her uncle, an Illinois farmer, "what big mosquitoes."

"Them ain't mosquitoes," was the rejoinder. "Them's sparrers."—*Merchant Traveler.*

CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT.	STRUCTURE	COST.
New York, N. Y.	The City	N. D. Bush	Police Station	$ 80,000
New York.	The City	Withers & Dickson	Ex- Bell.Hospital	21,500
New York.	Union Biblical Institute	T. K. Irving	Institute building	1,500,000
New York.	A. B. Darling	D. & J. Jardine	Factory	35,000
New York.	Safety Electric Light Co.	W. A. Brown	Factory	25,000
New York	F. J. Schnugg	Herter Bros.	Flats	84,000
New Yerk	C. & A. Ruff	Rentz &Lange	Flats	96,000
New York	C. & A. Ruff	Rentz & Lange	Store and flats	20,000
Findlay, O.	Swing, Eli & Co.	Kramer & Zoll	Factory	10,000
Findlay, O.	Adams & Sheets	Kramer & Zoll	Factory	10,000
Peoria, Ill.	Martin Kingman	Philips F. Mehler	Warehouse	30,000
Peoria	Second Presbyterian Church	W. W. Boyington, Chicago.	Church	50,000
Cincinnati, O.	Mr. Hoffman	G. & A. Brink	Warehouse	16,000
Cincinnati	Taylor & Faulkner	Geo. F. Aeiber	Factory	6,000
Milwaukee, Wis.	First Baptists	S. S. Beman	Church	40,000
Chicago, Ill.	Messrs. A. D. Skillman & Co.	Louis Martens	Stores and flats	50,000
Chicago	H. Wedemeyer	Louis Martens	Stores and flats	35,000
Chicago		W. H. Adams	Residences	20,000
Chicago		Messrs. Wilson, Marble & Lamson	Apartment building	50,000
Chicago		L. G. Halberg	Residences	25,000
Chicago	Episcopals	Clinton J. Warren	Church	35,000
Chicago	J. F. Wallach	S. S. Beman	Residence	12,000
Chicago	Wm. C. Stevens	Pond & Pond	Office building	50,000
Chicago	Mrs. Emma S. Mendel	Schaub & Berlin	Flat	10,000
Chicago	John Folstoff	Theo. Lewandowski	Flat	16,000
Chicago	John Ruprecht	Furst & Rudolph	Flats and store	22,000
Bridgeport, Cnn.	The City	C. T. Beardsley	Engine house	10,000
New London, Conn.	G. G. Haven & Co.		Casino	100,000
Hartford, Conn.	Y. M. C. A.		Building	125,000
Versailles, Conn.	James Hurley		Store and flats	10,000
Arkansas City, Kan.	A. A. Newman	Wm. Gall	Building	8,000
New Britain, Conn.	W. I. Fielding	J. J. McCarthy	Store and flats	18,000
Danbury, Conn.	Mrs. V. E. Hawley	F. S. Olmstead	Store and office bldg.	20,000
South Norwalk, Conn.	Michael Becker	W. S. Knapp	Flat	16,000
South Norwalk	Old Well Cigar Co.	W. S. Knapp	Factory	20,000
Hartford, Conn.	Hartford & Conn. Western R. R.	B. M. Lincoln	Depot	20,000
Detroit, Mich.	D J. Campan	D. J. Campan	Residence	25,500
Mishawaka, Ind.	The Roper Furniture Co.		Factory	10,000
Davenport, Iowa	Riemers & Fernald	J. W. Ross	Factory	10,000
Starkville, Miss.	T. J. Wood & Co.	A. L. F. Zucker	Factory	10,000
Carthage, Mo.	E. W. Barns		Boiler shops	40,000
Boston, Mass.	R. C. Hooper	Andrews & Jacques	Residences	130,000
Starkville, Miss.	Starkville Groc. & Farmers' Sup. Co	A. L. F. Zucker	Store and office bldg	11,000
Sault St. Marie, Mich.	W. J. VanAukin	Johnson & Johnson	Store and office	15,000
East Saginaw, Mich.	Frank Lawrence	Wm. T. Casper	Business block	10,000
Oakland, Cal.	Mrs. M. K. Blake	F. K. Shattuck	Store and office bldg.	100,000
St. Louis, Mo.	E. H. Warner	T. C. Link	Residence	15,000
St. Louis	J. W. Ruel	T. C. Link	Residence	20,000
Springfield, Ill.	Christ Episcopal Church	Bullard & Bullard	Church	17,000
Ft. Smith, Ark.	Masons	W. H. Byram	Temple	17,000
Topeka, Kan.	The Topeka Club	Seymour Davis	Club House	15,000
Hot Springs, Ark.	The City	B. J. Bartlet	Hall	20,000
Laramie, Wy. Ter.	The City	W. O. Owen	Jail	
North Yakima, W. T.	David Wilson		Hotel	40,000
Starkville, Miss.	Starkville Hotel Co.	A. L. F. Zucker	Hotel& bus. bldg.	15,000
Marietta, Ga	Blackwell, Brown & Co.	Morgan & Bruce	Hotel	15,000
Chattanooga, Tenn.	Geo. T. White	Schoen & Edwards	Hotel	15,000
Madison, Ga.	W A. Broughton		Hotel	50,000
St. Augustine, Fla.	Hotel Cordova		Improvements	25,000
Calhoun, Ga.		W. H. Parkins	Court house	
Warsaw, Va.	Richmond County		Court house	25,000
Nashville, Tenn.	J. R. Daniel		Residence	10,000
Sheffield, Ala.	Horace Ware		6-story stone bldg.	
Conway, Ark.	The City	Mayor	School house	10,000
Pratt Mines, Ala.	Tennessee Coal, Iron & R. R. Co.		Prison	18,000
Somerset, Ky.	James Denton		School house	10,000
Philadelphia, Pa.	Phila Art Club	Frank Milas Day	Club house	70,000
Kalamazoo, Mich.	The County	M. W. Roberts	Poor house	21,000
Visalia. Cal.	The City		School house	20,000
Milwaukee, Wis.	David N. Benjamin		Residence	100,000
Minneapolis, Minn.	E. A. Merri t	W. C. Whitney	Residence	40.000
Lexington, Ky.	F. A. Harrison	H. L. Rowe	Residence	15,000
Elmira, N. Y.	Advertiser Ass'n	Pierce & Dockstader	Office building	15,000
Hudson, N. Y.	P. M. Donald	M. O. Connor	Store and flats	12,000
Lexington, Ky.	J. A. Reed		Hotel Imp.	10,000
Reed Springs, Mo.	Reed Springs Hotel Co.		Hotel	50,000
Kansas City, Mo.	The County	A. B. Cross	Court house	500,000
Toronto, Ont.	Board of Trade	Edgar Wills	Building	200,000
Minneapolis	E A. Merritt	W. C. Whitney		40,000
Albany, N. Y.	Michael A. Schrodt.		Residence	15,000

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT.	STRUCTURE.	COST.
Chicago	F. T. Colby	Geo. Grussing	Residence	$ 5,000
Chicago	Mr. McClure	Geo. Grussing	Flats	6,000
Chicago	St. Ann's R. C. Parish	Ackerman & Starbuck	School house	
Chicago		Geo. Grussing .	8 Residences	24,000
Chicago	Chas Lange	Fred Ahlschlager	Stores and Flats	8,000
Chicago	Chas. Steinbrecher	J. H. Huber	Flats	10,000
Chicago	Robert Robertson	J. Woollacott & Son	Flats	13,000
Chicago	Dr. Michelet	J. Woollacott & Son	Flats	10,000
Chicago	A. H. Sanders	C. A. Weary	Residence	15,000
Chicago	Magnus O. Benson	C. A. Weary	Flats	5,000
Chicago	Lipman Glick	L. A. Dixon	Residence	10,000
Chicago	Messrs. Kirchstein	J. H. Huber	Residences	12,000
Chicago		W. L. Carroll	Residences	20,000
Chicago	J. B. Mallers	Flanders & Zimmermam	Warehouse	
Chicago	Henry Cohn	J. J. Koohn	Flats	30,000
Chicago	S. T. King	F. B. Abbott	Addition & Imp.	
Chicago		T. V. Wadskier	Flats and store	50,000
Chicago	Patrick Casey	J. M. VanOsdell	Warehouse	25,000
Chicago	John DeKoven		Improvements	20,000
Chicago	B. Denner		Flats and stores	8,000
Chicago	W. W. Henderson	W. J. VanKenren	Flats	4,000
Chicago	Capt. W. Johnson	Edbrooke & Burnham	Flats	25,000
Chicago	A. H. Gates	L. G. Hallberg	Flats	12,000
Chicago		E. E. Snyder	Flats	7,000
Chicago		M. F. McCarthy	4 stores and flats	28,000
Chicago		M. F. McCarthy	Flats	22,000
Chicago	W. W. Henderson	M. F. McCarthy	Stores and flats	56,000
Chicago	Biederman Bros.	J. A. Wierzbleniec	Flats	6,000
Chicago		Lutken & Thisslew	Flats	7,500
Chicago	South Side Water Works	Edbrooke & Palmer	Business block	100,000
Chicago	M. E. Church, Center-ave.	C. M. Palmer	Church	16,000
Chicago	M. E. Church	C. M. Palmer	Church	20,000
Chicago	H. A. Hurlbut	H. B. Seeley	Flats	18,000
Chicago	H. A. Hurlbut	H. B. Seeley	Store and Flats	15,000
Chicago	L. W. Perce	H. B. Seeley	Business block	80,000
Chicago	S. S. Gregory	H, B. Seeley	Residence	10,000
Chicago	F. P. Owings	H. B. Seeley	Warehouse	75,000
Chicago	Covenant Baptist Church	J. T. Long	Church	15,000
New York City	L. Mickowsky	F. Ebeling	Flats	11.000
New York City.	W. Friedman	F. Ebeling	Tenement house	12,000
New York City.	C. F. Allen	Thorn & Wilson	Flats	16,000
New York City.	Sevestre & Cusack	Rentz & Lange	Flats	18,000
New York City.	C. & A. Ruff	Schneider & Herter	Flats	23,000
New York City.	G. W. Vultee	Herbert Pierson & Co.	Flats	120,000
New York City.	G. Kemp	R. C. Jones	Hotel	75,000
New York City.	Com. of Public Char. & Cor.	Withers & Dickson	Hospital	25,000
New York City.	James J. Curr	W. B. Tuthill	3 Flats	22,500
New York City.	Harlem Club	Lamb & Rich	Club House	50,000
New York City.	G. H. Stone	G. H. Shellinger	2 Residences	18,000
Detroit, Mich.	Joseph Willman	A. J. Bast	Residence	3,000
Detroit	Theo Hinkler	G. & A. Brink	Residence	3,000
Detroit	J. B. Lucus	G. & A. Brink	Residence	4,000
Detroit	W. C. Claxton	Chas. W. Smith	Residence	6,000
Detroit	Detroit-White Lead works	Mason & Rice	Factory	25,000
Detroit	Palms Estate	J. W. Carpenter	Mausoleum	55,000
Detroit	Board of Education	Robt. W. Wallace	School	52,000
Cincinnati, O.	F. Groneman	E. F. Bande	Residence	
Cincinnati, O	Second German Pres. congregation	Louis Picket	Church	8,000
Cincinnati, O.	Dr. Todd A. Reamy	James McLaughlin	Add. to hospital	4,500
Milwaukee, Wis.	Free Masons	Crain A. Barkhusen	Hall	60,000
Milwaukee, Wis.	Geo. W. Porth		Natatorium	
Milwaukee, Wis.	Jamel Cohn	Alfred C. Clas	Residence	10,000
Milwaukee, Wis.	David N. Benjamin	C. A. Gombert	Stone Palace	100,000
Milwaukee, Wis.	Joseph Schlitz Brewing Co.	G. B. Ferry	Business block	9,000
Milwaukee, Wis.	J. J. Mayer	James Douglass	Residence	
Milwaukee, Wis.	Anson K. Mayhew	T. Mix & Co.	Residence	10,000
Milwaukee,Wis.	John Welch	James Douglass	Residence	
Tiffin, O.	Belginm Colored Glass Works Co.	T. K. Hewitt	Factory	
Reading, Pa.	John D. Mishler	Ackerman & Starbuck, Chicago	Residence	
Davenport, Iowa.	Baptist Church	J. Woollacott & Son, Chicago	Church	35,000
Brooklyn, N.Y.	W. J. Rider	A. Hill	Three residences	15,000
Brooklyn, N. Y.	Edw. Phillips	Edw. Phillips	Store and flats	7,000
Brooklyn, N. Y.	W. H. H. Young	H. Vollweiler	Stores and flats	10,000
Lexington, Ky.	A. A. Kitzmill	J. H. McMurty	Warehouse	8,000
Falls River, Mass.		County commissioner Perry	Court house	
Milwaukee, Wis.	National Knitting Wks.	Schnetzky	Warehouse	15,000
Penn Yan, N. Y.	Commissioners of Yates Co.	Pierce & Dockstader.	Co. Clerk's office	11,000
St. Augustine, Fla.	T. M. Smith	S. B. Mance	Hotel	75,000
Troy, N. Y.	Rev. J. L. Atwood		Church	40,000
Leavenworth, Kan.	Congregational Church Society.		Church	30,000
Albany, N. Y.	Church of our Lady of Angels	Ogden & Wright	Church	15,000
Aurora, N. Y.	Welles College		College	100,000
Jamestown, N. Y.	Board of Education	Aaron Hall	School building	9,000
Lexington, Ky.	School Board	Aldenburg & Scott	School house	8,500
Boston, Mass.		C. J. Bateman,	School house	70,000
Cambridge, Mass.		C. J. Bateman	School house	50,000

PRICE CURRENT.

ARTIFICIAL STONE.
(C A Stevens, Lansing, Mich.)

	Sq ft
Sidewalks	12½c
Building stone, plain	20 c

BLUESTONE.
(Lord & Griswold, Chicago.)

New York	45c
Wyoming Valley	45c

[Forest City Stone Co., Cleveland, O.,]
(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches,	20
	Sup. ft.
Flagging—	
5 to 6 inches thick, natural bed, any size up to 12 ft. long	19c

EUCLID BLUE AND COLUMBIA SANDSTONE—

Sawed Flagging.

1 in. thick	10c
2 "	10c
2½ "	12c
3 "	14c
4 "	18c

BROWNSTONE—

	cu. ft
Ohio—No. 1 Promiscuous blocks	60c
No. 2 " "	50c
Ashland, Wis.—Promiscuous blocks	60c
Connecticut—No. 1 " "	95c
No 1 " "	85c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	40
No. 2. " "	30c
No. 1. Monument Bases, broken to size	45c
No. 2. " " " "	35
Engine beds, broken to size,	40
Perch or Wall Stone, per ton railroad weight	60c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	60

NORTH RIVER BLUESTONE—
(Union Bluestone Co, New York.)

Flagging

Rough Flag, promiscuous sizes	$ 9
Smooth " " "	10
2 and 2 6 Smooth Flag, 1½ in. and over	12
2 " 3.6 " under 1½ in. thick	11
3 " 3 6 " 1½ in. and over	13
Cess-Pool Flag, 2 to 2.6 in. square, 2 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1½ and under 1¾ in 2 ft. and over wide, wide	13
4 and 4 6 in., smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in	23
3 ft. " " " 3 in	25
5 and 5.6 Smooth Flag, 2 in. and over	17
5 and 5.6 " " under 2 in	15
6 and 6 6 " " 2 in. and over 18,	16
6 and 6 6 " " under 2 in	16
Well Stone, 3 to 3½ in. thick, 4 to 4.6 in. square	24
Well Stone 3 to 3½ " 5 to 5.6 "	26

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag.

6 ft. to 6.6, x 5 to 6 ft. wide	$ 22
7 ft. to 7.6, x 4 to 5 ft "	24
8 ft. to 8.6, x 4 to 5 ft. "	26

The above to be 2½ inches thick.

Promiscuous Large Flag.

30 to 50 ft. 3 in. thick	28
50 to 70 "	34
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thicknesses at special prices.

For planing add 22 cents.

For rubbing add 35 cents.

Window Sills and Lintels.

3 x 8 in. Quarry cut	22
4 x 8 in. " "	24
5 x 8 in. " "	29

½ in. allowance in thickness.

Door Sills.

5 x 12 in. Quarry cut }
5 x 14 in. " " } 3½ cts. per in. in width
5 x 16 in. " " }

8 to 10 ft. long, add 10 cts. per foot

Curb, Quarry Cut.

Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in. thick	27
14 " under 4 in. "	28
14 " 4 in.	32
14 " bev'd, under 3½, 3 ft. and over, long	31
16 in. Curb, 3½ to 4, 4 ft. and over, long	33
18 " 3½ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 6 in. "	55
16 in. Corners, per set	5 50
20 " "	5 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.

12 in. gutter, 3 to 3½ in	17
12 in. " thin	14
14 in. " 3 to 3½, in 3 ft. and over, long	20
14 in. " thin, 2.6 and over, long	16
18 in Belgian Bridge, 4 in. thick	44
20 in. " " 4 in thick	55
24 in. " " 4 to 4½ in	65
24 in. " " 5 to 6 in	77
24 in. " " 7 to 8 in	90
19 in. Bridge Flag Joints, 3½ in	28
20 in. " " " 3½ in	40
24 in. " " " 4 in	50

Coping.

11 in. Coping, 2 to 3 in	28
14 " 2½ to 3 in	29
16 " 2½ and under 3½ in	40
18 " 3½ to 4 in	45
18 " 2½ to 4 in	50

20 in. to 36 in. Coping, 4 in. thick, 3½ cents per in. in width When ordered over 4 in. thick, special price will be given.

When ordered under 4 in. thick, 3 cents per in. in width.

Steps.

6 x 12 in. promiscuous lengths, under 8 ft	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft. and up to 10 ft. long add 10 cents per foot.

Rock.

Promiscuous Rock, per in. in thickness	9
Dimension Rock, per in. in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 inches Thick

Under 20 feet	30
20 feet and under 35 feet	35
35 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price

Above, if dimension both ways, add 10 per cent.

For 5 in.	add 10 cts.		
"	6	"	20
"	7	"	30
"	8	"	40
"	9	"	55
"	10	"	65
"	12	"	100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.

4x8 in	48
5x8 in	50
5x9 in	60
5x12 in	77

½ in allowance in thickness.

Rubbed Lintels.

3½ to 4 x 10½ in. under 8 ft	48
8 ft. and under 10 ft	60
4 in. x 12 in. under 8 ft. in length.	67

Rubbed Curb.

2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in	48
12 " " " 4 in	55

Rubbed Mantels.

4 x 10 in	56
4 x 12 in	66
4 x 14 in	75

Dimension lengths with heads, measure heads.

Rubbed Hearths.

3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4.6 in. long, 1.4 to 2 ft. wide	33
" 4.6 to 5.6 " 1.4 to 2.6 in wide	40
" 5.6 to 6 6 " 1.4 to 3 ft. wide	45
" 6.6 and under 8 ft long, 3 to 4 ft. wide	65

Rubbed and Jointed Tile.—Boxed.

Under 2½ in. thick, 12 to 30 in. square, per superficial ft	56

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.

3 ft. and 3 ft. 6 in., 1 ft. 6 in. and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 6 " 6 " 2 " "	39
6 " 6 " 8 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cemetary and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

Trade discounts on application.

BROWNSTONE.
(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, unless otherwise mentioned]

	Cu. ft.		
Carbondale, light	70c.	f. o. b.	quarry
" dark	95	"	"
Hummelstown	45	"	"
Lake Superior { Marquette	1 00	"	Chicago
Lake Superior { Rain Drop	1 00	"	"
Trenton	50		
Linden	50		
New Brunswick	45		
Kibbie—Massachusetts	65		

OHIO BROWNSTONE—

	Cu. ft.
Killbuck	45c
Gaon	45c
No. 1. Promiscuous blocks	45c
No. 2. " "	30

Stone ordered to dimension sizes 10 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT BROWNSTONE—
(Middlesex Quarry Co., Portland)

	Cu ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc, No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc, No. 2, 40 cu. ft. and over, price to be agreed upon.	
	Superficial
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft long, promiscuous sizes	63
Platforms, Cornice, etc, 7 to 8 in. thick, under 16 superficial feet	85
Platform, Cornice, etc, 16 and under 24 superficial ft.	1 00
" " etc, 24 " " 32 " ft.	1 12
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashler, under 4 in. thick	20
Flag	30
Window Staff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 6 in. promiscuous lengths	63
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft	1 30
" " 10 and under 20 cu. ft	1 50
" " 20 cu. ft. and over, price to be agreed upon	
Monumental Stone, 8 to 12 in. thick, charged 12 in.	
Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in thick	56

Discount 5 per cent.; cash or approved Notes, at two months.

FREESTONE.
(Lord & Griswold, Chicago.)

New Brunswick brown	.45c
Buena Vista	.40
Ohio	.30
Long meadow, brown	.60

GRANITE.
(Lord & Griswold, Chicago.)

Westerly	
Monson	.65c
Woodstock	.65c
Mica Stone	.50c
Port Deposit	.65c

GREEN STONE.
(Lord & Griswold, Chicago.)

Pennsylvania	.50c

LIME, CEMENT, ETC.
(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	60
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " " " " " "	35
Fire brick Savage per 100	6 00
" " Aetna " "	4 00
" " Montezuma " "	3 50
" " West Virginia " "	3 00
Ground fire clay, best, per bushel	1 00
" " " common " "	75

Discounts

Vitrified sewer pipe,	50 per cent.
Flue Pipe, for Chimneys	25 " "
Terra Cotta Chimney Tops	35

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f.o.b. Erie.

LIMESTONE.
(Lord & Griswold, Chicago.)

	Cu ft.		
Salem, Bedford	25c	f. o. b	quarry.
Oolitic, " buff	25	"	"
" " blue	35	"	"
Oolitic Bowling Green	25	"	"
Artesian	35	"	"
Grafton	35	"	"

MAGNESIAN—
(J. A. Green, Stone City Iowa.)

Dimension Stone—(First Quality of all ordinary sizes.)

12 inches and over, per cubic foot	$ 35
11 to 12 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17

Vault covers—(Large size.)

7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25

Flagging Stone—(Ordinary size.)

5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10

Bridge Stone.

Common, per cubic yard	$ 2 50
Coppings, " " "	6 75
Pedestal Bases, per cubic yard	6 75

Footing Stone.

Dimensions, per cubic yard	$ 3 25
Common, " " "	2 50

Rubble or Building Stone.

Common Rubble, Per 100 lbs	2½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	8

Street Crossings.

5 to 6 inches, per superficial foot	$ 15
Curbing, 5 to 6 inches thick, per superficial ft.	15

Cut and Rubbed Stone—(Finished Ready to lay in their place.)

Ashlars per sq. ft. measuring all that shows	$ 60
Base	70

Corner Blocks

Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds, or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

(Lord & Griswold, Chicago.)

JOLIET ... Rubble, $6 cord; dimension 30c
Planed sidewalk, Chicago ... 64c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts, per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts extra per superficial foot.

Rough Stone

Mill Blocks as quarried, per cu ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $10 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft	15c
Promiscuous good select Bridge Stone, cu ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 3 per ct., on rough and dimension, and 5 per ct. on sawed.

[Big 4 Limestone Co., New Point, Ind.]

Prices on cars at quarry, the buyer paying freights.

Flagging for Sidewalks.

	In Rough.	Jointed.	Jointed and 4 cut Hammered
3-inch	10c	13c	20c
4 "	16c	21c	26c
5 "	17c	22c	27c
6 "	18c	24c	30c
7 "	22c	28c	34c
8 "	24c	30c	35c
9 "	26c	33c	39c
10 "	28c	36c	42c
11 "	30c	38c	44c
12 "	32c	40c	45c

2c extra when over 14 feet long or in strips less than 2 feet broad.

Platforms

	In Rough	6-cut Face. 8-cut Edges.	8-cut Face 10-cut Edges.
6-inch	22c	50c	65c
7 "	24c	53c	65c
8 "	28c	58c	65c
9 "	30c	58c	65c

Block Stone.	Cu. ft.
12 inches thick or over	——
Irregular sizes, 20x70 ft.	30c
Special sizes	35c
Bases	33c

Block stone less the 12 in. thick at Flagging Prices.

Bridge Stone.	Ton of 2,000 lbs.
First-class, dressed	$2 25
" undressed	1 30
Second-class	1 00
Coping, 12 in. thick and over	2 15

" less than 12 in. thick at flagging prices.

Building stone.	Ton of 2,000 lbs.
Riprap	$0 26
Ordinary Rubble	50
Range Rubble (select)	1 00
Scrap Flagging	1 50

Range stone 6 to 10 in. thick, 8 to 10 in. wide, 15c lin. ft.

Jail Stone.	6-cut Hammered.
6-inch, one side dressed	34c
both sides dressed	46c
7-inch, one side dressed	38c
both sides dressed	50
8-inch, one side dressed	42c
both sides dressed	54c
9-inches, one side dressed	46c
both sides dressed	58c

Door Sills and Steps

6-inch, per sup. foot in rough	Sq. ft.	20c
7 " " "	"	25c
8 " " "	"	30c
Ordinary dress, 6-cut edge, 4 cut face	Sup. ft.	50c
Extra dress, 8-cut edge, 6 cut face	"	58c
" 10 " 8 "	"	65c
Sawed sills of all kinds per sup. foot		——

Strips less than 12 inches wide same price per lineal foot as Sills and Steps are per superficial foot.

Culvert Covering and Footings

Same price as Footings.

Irregular sizes, ... 8 to 9 in. thick, 11c 10 to 12 in. 12c
Dimension " ... 8 to 9 in. thick, 13c 10 to 12 in. 14c

Crushed Stone.

In orders for 25 cars and over ... 35c per ton.
" of less than 25 cars ... 40c "

Invert Stone for Sewers.

9x30 in. x2 ft radius ... 85c lineal foot.
9x30 in. x3 ft. " ... 90c "

Pier Stone.

Stone in rough, 25c per cubic foot.

The thickness optional with consignor.

If dressed, add to price of stone in rough for bedding and pitching face, 15c per cubic foot. For bedding and tooth axing face, 25c per foot face measure.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	25
6 " " " "	22
5 " " " "	20
4 " " " "	15
3 " " " "	10

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	23
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $1.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing.

10 to 12 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone.

$1 to $4.50 ... per cubic yard.

Rip-Rap

$1 to $2 00 ... per car load.

MARBLE.

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888	Superficial in. ¾	1	1¼	1½	2	3	4	Monumental.
Dark Veined Blue	25	30	35	40	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	45	55	82	1 10	4 00
Ex. Dk. Veined Blue	35	40	50	60	60	90	1 20	4 50
Ex. Dk. Mottled Blue	40	45	55	70	70	1 00	1 40	5 00

Dark blue base stripe and posts, per cubic foot	$1 75
Dark blue bottom bases ... per cubic foot	1 75
Dark blue bottom bases defective, per cubic foot	1 25
Dark blue markers, 0 10 to 1.2 long, 3 in. thick each	50
Dark blue markers, 0.10 to 1, 2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 8 in. wide, assorted sizes each.	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra ... cubic foot	50
Stripe ordered 7 0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing ... per cubic foot.	35
Boxing ... " "	25

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental
Statuary	90	1 15	Same as 2 inch	1 25	2 00	2 70	8 50
No. 1	75	90		1 10	1 65	2 20	6 50
Average	60	70		75	1 12	1 50	5 25
No. 2	40	45		55	72	1 10	4 25
Rutland Italian	30	35		45	82	1 10	4 25
Mottled Smith	......	......		40	60	90	3 50
Best No. 3	27	32		35	52	70	3 00
No. 3	18	22		25	37	50	3 00
Extra dark and mottled blue	40	50		60	90	1 20	4 50
Dark blue	30	35		50	75	1 00	3 50
Light blue	20	25		30	45	60	2 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in inches.	Diam. Bowl in inches.	Rutland Average. S. F. D. M. V. Mount Dk. No. 1	R'tl'd No. 1 ex. dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No. 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue. Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	3 40
8	5	2 95	2 85	2 75	2 65	2 55	3 65
9	5	3 15	3 05	2 95	2 85	2 75	3 75
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 80	3 60	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	2 95	3 70	5 50
14	6	4 80	4 60	4 30	4 10	3 80	5 70
12	7	5 15	4 85	4 55	4 35	4 15	5 70
13	7	5 35	5 05	4 75	4 55	4 35	6 25
14	7	5 65	5 25	4 95	4 65	4 45	6 50
15	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 60	6 20	5 80	5 60	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 00	7 40	6 90	6 40	6 00	8 90
16	9	8 80	8 10	7 50	7 00	6 60	9 40
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 60	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 80
18	10	11 35	10 35	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 25	14 25
24	10	13 75	12 45	11 35	10 35	9 55	15 75
18	11	13 75	12 65	11 55	10 65	9 95	15 85
20	11	14 55	13 25	12 15	11 15	10 35	15 85
22	11	15 35	13 95	12 75	11 65	10 85	16 85
24	11	16 25	14 65	13 35	12 15	11 25	17 85
18	12	15 85	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 85	17 95
22	12	17 75	16 05	14 65	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 85	13 15	......
28	12	20 65	18 45	16 55	14 95	13 65	......
24	13	21 20	19 00	17 10	15 50	14 20	......
26	13	22 60	20 10	18 00	16 30	14 80	......
28	13	23 80	21 20	19 00	17 10	15 60	......
30	13	25 00	22 30	19 90	17 90	16 30	......
24	14	25 80	23 20	21 00	19 10	17 00	......
26	14	27 40	24 70	22 30	20 30	18 70	......
28	14	29 20	26 20	23 60	21 40	19 70	......
30	14	30 90	27 70	24 90	22 50	20 70	......
32	14	32 70	29 20	26 20	23 70	21 80	......

Hearths, 1 in., sawed edges, per sup. foot	$ 24
No. 2 Base stripe and posts, cubic foot	1 90
Inferior No. 3 posts and stripe "	1 65
" No. 3 bottom bases "	1 65
" No. blue posts, stripes and bottom bases	2 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4 "	1 00
Footstones, 5 to 8 in., each	30
" sawed heads, each	32
" " sand rub and box	38

SUTHERLAND FALLS MARBLE—

1888	Superficial. 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental.
Mourning vains	63	66	87	92	1 28	1 84	5 40
No. 1	48	58	82	87	1 30	1 74	4 90
Average	38	49	62	67	1 00	1 34	4 40
No 2	28	34	42	47	70	94	3 15
Best No 3	23	29	35	37	56	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Stripe and Posts, per cubic ft.	$1 90
Inferior No. 3, Posts and Strips, per cubic foot	1 65
Inferior No. 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 12 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 2 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup. ft.	21

ITALIAN MARBLE—	Cu. ft.
Monumental stock	$3 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size.
¾ in. slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubit foot.

MOUNTAIN DARK MARBLE—

1888	Superficial.					Cu.
	¾ in.	1¼ in.	2 in.	3 in.	4 in.	Monumental.
No. 1	3	74	1 07	1 60	2 14	5 90
Average	43	64	87	1 30	1 70	4 90
No. 2	32	49	67	1 00	1 34	3 90
No. 3	25	34	52	78	1 04	3 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No. 3, Strips and Posts, per cu. ft.	6 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

SPECIALS—

Diminished Dies, extra........per cubic foot	50c
Stripe ordered 7 ft. long and over, extra per cubic foot.	50
Sawing edges slabs, 1 inch thick per superficial ft.	03
" " " 2 " " "	05
" " " 3 " " "	08
" " " 4 " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock........per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths........per surface foot rubbed.	05

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " " small lots,		12
Sponges	per lb.	75
Red Grit	"	05
Nova Scotia Blue Grit	"	06
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

TOOLS—

¼ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	33
Frosting Tools	per doz.	3 00
⅜ in. Granite Lettering Tools	"	2 50
½ " " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mash "	" 2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	2 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb.	each,	$ 50
3 to 5 lb.	"	75
5 to 7 lb.	"	1 25
8 lb. and up	"	1 50

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 2 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 34,000 pounds or more in one order.

Branches of Vermont Marble Co. see price list.

Toledo	.40c.
Cleveland	.35
Boston	.50
Philadelphia	.45
Detroit	.40
Chicago	.50
St. Louis	.60

(Lord & Griswold, Chicago.)

	Cu. ft.		
Tennessee Red	$2 50@$5 00	f. o. b.	Chicago
" Knoxville	3 00	"	"
Vermont White	2 50@ 5 00	"	"
Ophite	4 50@ 5 00	"	"
Armodite	1 50	"	"

GEORGIA MARBLE—

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	Cubic foot. At Cincinnati
Kennesaw, selected	$6 50	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 60
Cherokee, average	2 75	3 10
No. 3 base Strips and Posts.	1 60	1 95
Inferior No. 3 Posts and strips	1 35	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	65
Markers, 16 to 16 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	25	35
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	60
Stripe ordered, 9 feet long or over, extra	50	50

Urn list, sent on application.

(Columbian Marble Company.)

SAWED MARBLE —

Columbian Dark.

	per cu. ft.
Extra dark variegated	$5 00
No. 1. dark variegated	4 50
No. 1 dark mottled	4 50
No. 2 dark	3 50
Pearl blue	3 50
Inferior dark bases and stripe	1 75

Columbian light.

Light medium Cloud	$4 50
Best light cloud	3 50
No. 2 light cloud	2 50
No. 3 light cloud	2 00
Inferior light	1 25

	Per superficial foot. 1 in.	1¼ in.	1½ in.
Extra dark variegated	.50	62	80
No. 1 dark variegated	.40	55	75
No. 1 dark mottled	.40	55	75
Pearl blue	.35	45	55
Light medium cloud.	.40	55	75
Best light cloud	.35	45	55
No. 2 light	.25	30	35
No. 3 light	.18	22	25
Hearth, sawed edges	.20	—	—

Sawed marble.

	each.
Footstones, 5 to 8 inches	$ .20
Footstones, 5 to 8 inches, sawed heads	.22
Footstones, 5 to 8 inches, sawed heads, sanded and boxed	.28
Footstones, 5 to 8 inches, oval heads	.28
	per cu ft.
Diminished dies, extra	$ .50
Stripe and posts, 7 feet and over, extra	.50
Sand rubbing	.35
Boxing	.25

All monumental stock will be boxed, with the exception of base stripe and posts, unless otherwise ordered.

Building marble, tile and curbing. Prices given on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

	cu. ft.
Extra dark veined	$4 50
Dark blue	3 50

MACHINERY.

STEAM PUMPS—	Discount
Smedley's	25 per ct.
PULVERIZERS—	Discount
Cyclone	20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete	$400

EXCAVATORS—

Little Giant	$4,500
Railroad Giant	6,500

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting, Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two.	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20	25.00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$60.00
" 0	" " " " with "	54.00
" 1	" 21x27, " 10 with hood	40.00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 5,	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Steel "Hercules"	42½ per ct.
Steel	42½ "
Gal. Iron	35 "
Iron	35 "
Wire Rope Blocks	25 "

(Washburn & Moen M'f'g. Co.)

Iron	33⅓
Steel	37½
Gal. Iron	33⅓

BLOCKS AND TACKLE—

(Toledo Block Works.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron bushed	2 40	4 50	6 30
10 " "	3 30	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	5 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	16 00	29 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00
Wrought-Iron Tackle Blocks	**Single**	**Double**	**Triple**
6 inch	1 40	2 25	2 75
8 "	2 40	3 50	4 50
12 "	4 55	8 10	10 40
16 "	9 55	15 70	22 00
20 "	22 00	33 40	50 00

Iron-bushed, discount 20 per cent.; roller-bushed discount 10 per cent.

(Detroit Block Works.)

Discount from list	40 per ct.

WROUGHT-IRON PIPE—

(American Tube & Iron Co.)	Discount
Butt weld. black	55 per ct.
" " galv.	45 "
Lap " black	65 "
" " galv	55 "

BELTING-RUBBER.—

Standard	60 per ct. and 10 per ct.
X quality	50 " " 10 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.)	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	32 00

RED SANDSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	.60c
Dunreith, red	.50c
" variegated	.35c
Darlington	.40
McArthur	.65
Carlisle	.65
Potomac	.50

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—	Cu. ft.
No. 1 Promiscuous block	.50c
No 2 " "	.40
BEREA AND BLUE AMHERST—	
No. 1 Promiscuous Blocks	.40c
No. 2 " "	.30
No. 1 Monument Bases, broken to size	.45
No. 2 " " " "	.35
Pier Blocks " "	.20

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 8 " "	.09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	.25c
6 " " "	.46
9 " " "	.68
12 " " "	.88
3 in. Berea or Blue Amherst	.21
6 " " "	.41
12 " " "	.77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	.10
2½ " "	.12
3 " "	.14
4 " "	.18

SPLIT PLATFORMS—

	Superficial feet. 5 in.	18 in.
No. 1 Buff Amherst	.25c	60c
No. 2 " "	.20c	50
No. 1 Berea or Blue Amherst,	.20c	50
No. 2 " " "	.17c	40
No. 3 " " " (for sidewalks)	12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—

	Cu. ft.
Promiscuous Blocks	.15c

Write for discounts, etc.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—	Cu. ft.
No. 1	.30c
No. 2	.25

(French Fort Quarry, New Castle, N. B.)

Olive	40c f. o. b.

(Babbitt Sandstone Co., Ypsilanti, Mich.)

Brown Sandstone	25 f. o. b. quarry

(Lake Huron Stone Co., Detroit, Mich.)

Blue Sandstone	20c f. o. b.

SLATE.

(Henry Fulmer, Easton, Pa.)

F. O. B. Slatington, Pa.

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft.
2½ foot wide	.16c
3 " "	.18
3½ " "	.19
4 " "	.22

Mantel stock as it runs through 18 cents square foot in car lots.

ROOFIN' SLATE—

Size.	No. in sq.		Size.	No. in sq.	
14x24	98	$3 50	10x18	192	$3 75
13x24	106		9x18	214	
12x24	115		10x16	222	
12x22	127		9x16	247	
11x22	138		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

[Coalman & Westcott Fairhaven Vt..]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17
For rubbing both faces of above, excepting caps and trusses extra	02
Any of the above unrubbed less	01
Steps, to 5 ft. in length	20
Steps, 5 ft. to 8 ft, "	25
Steps larger	special
Platforms to 16 sup. ft.	20
" 16 to 22 " "	25
" 22 to 28 " "	30
" Larger	special

Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special

Wainscoting, sup ft.			20
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Black Boards, 3½ ft. to 4 ft. wide crated,	"	"	22
Thresholds to 5 ft in length	"	"	20
" 5 ft. to 8 ft. "	"	"	25
Curriers' Slabs, faced one side crated,	"	"	30
Curriers' Slabs, faced two sides, crated,	"	"	34
Billiard Table Beds, crated,	"	"	22
Imposing Stones,	"	"	30
Grave Covers, sawn and planed only, and in two or more pieces.	"	"	16
Grave Boxes, rabbeted ends,	"	"	20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness,	"	"	16
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22 to 28	"	"	30

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20x12	3 85	2 25
20x10	3 85	2 25
18x12	3 50	2 25
18x10	3 50	2 25
18x 9	3 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	3 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	2 75	2 25
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Aug. 25, 1888

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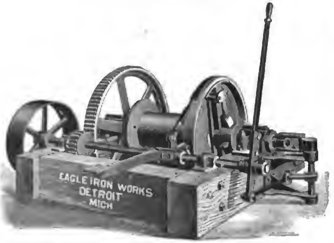
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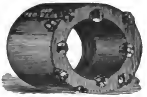

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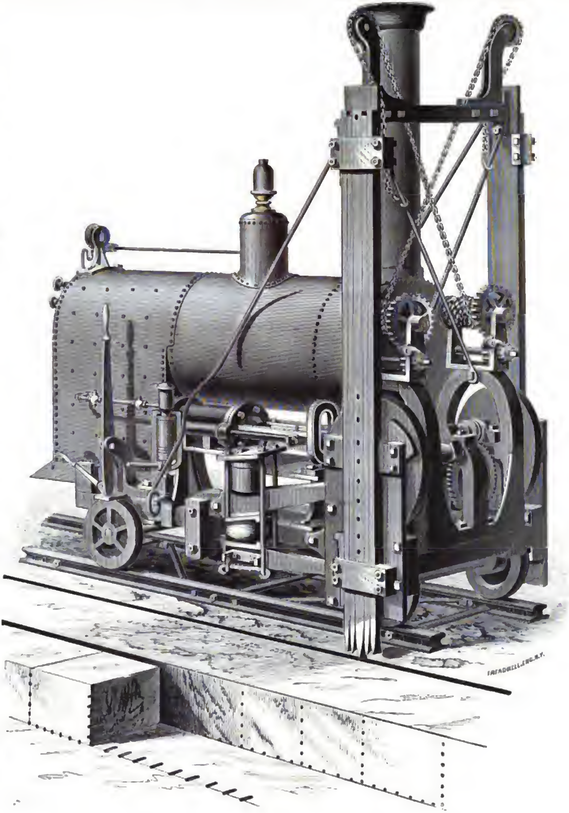
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The plan, elevations and perspective are to be drawn on a scale of three-quarters of an inch to the foot. The plan and elevation are to be placed upon one sheet of paper.

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The plan and elevations are to be finished with India ink and drawing-pen. They are to be black lined and no shadows are to be cast. There is to be no brush work except to indicate the sections of the plan. The perspective is to be drawn in line only, without any background or foreground. Pen-and-ink shading will be permitted on the body of the tablet itself. It is particularly desired, however, that it be of a simple character, so as to admit of its proper reduction and reproduction by the ordinary processes of photo-engraving.

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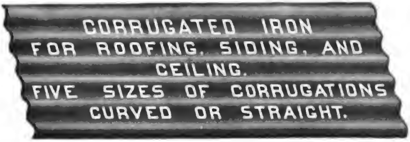
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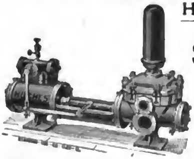

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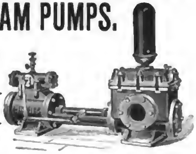

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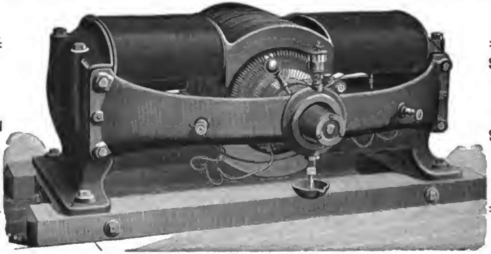

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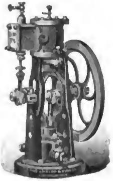

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STONE

VOL. I. INDIANAPOLIS, IND., OCTOBER, 1888. NO. VI.

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite

PUBLISHED MONTHLY BY

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It is unsafe to transmit currency or postal notes in the mails as at present managed. We desire our patrons to take notice of this, and *not risk the loss of heir remittances* to us. We have lost many valuable letters during the past three years, and we have failed to recover a single one, though we have tried every means to do so. Whether Democrats or Republicans are responsible for this unfortunate condition of the postal service is no concern to us. *We know it is wofully inefficient*—if anything worse now than it was two years ago—and there is no near prospect of improvement. *In sending us money, purchase a money order, express order, or registered letter, or New York or Chicago bank draft.*

STATE GEOLGOISTS.

IN the ordinary course of news we hear not a little about the governors of our states,—the states attorney, the secretary of state, and other state officers. The governor is particularly prominent. The state geologist is not so well known. He is not elected by the people direct. Sometimes there is a shadow of political preferment in his choice; not often, however. There is such an officer in this state at this time, one who is not ambitious or industrious as a geologist. More often, however, the geologist is one who has a very high regard for his own work and is of great help to the state. We can hope that other states have been or are as fortunate as has been Indiana in the past. Prof. Cox was a man of indomitable energy, a man as intelligent as he was enthusiastic, with his heart in his work. He was a man of good business methods, one to command respect from business men. It was he who took up the coal interests and brought them to the attention of the people of his own state and capitalists outside. It resulted in building up a large business at once. He centered his work in this direction. He contributed much general and special information in regard to other topics. He was particularly interested in the clay of Indiana.

After him came Prof. Collett, whose great work from a practical standpoint was in the interest of stone. To him may be credited the rapid developement of the stone interests in the state. It may be that the stone business would have flourished in time without his work. It certainly could not have come to the prominent and early attention which it has met. His methods, which were of the most vigorous character, were fortified by the completest information.

Prof. Collett was a member of the state house commission and aided them in selecting stone for that structure. It was at a time when information of that character was rare and most valuable. There was little positive knowledge in regard to the stone of Indiana. Prof. Collett was fully equipped and equal to the emergency. While the developement of the stone interests was the principal part of Prof. Collett's geological work it was not by any means his only work. He collected a vast amount of information in regard to paleontology, to the mound builders, prepared a complete geological map and did geological work of a high character.

It has been said by one who is well informed in this line that the geological work of Arkansas is at this time in good hands and is well cared for. Sufficient appropriations have been made and the appointment of state geologist made by the governor, who is a man with breadth enough to select one particularly well fitted for the place. The Minnesota geological reports come to us in good form. The report of the state of New Jersey is said to be the best of any in the country, though the practical geology of all of the older states has been well handled, Ohio, notably so. Michigan is moving in the proper direction. We notice that this state is developing slate quarries. The newer Western states could do nothing better than to see that this department of the state work is liberally endowed with money and brains.

BEAUTY OF INDIANA STONE.

Professor John Collett directs attention to the stone front of Fletcher's bank building in this city as evidence of the exceptional merits of Indiana's oolitic stone. It has recently been cleaned with steel brushes, and is now brighter than when the building was first erected. The Indiana state house is built of the same material, and it is destined to become more beautiful as it grows older, Professor Collett says, until it will finally acquire a polish brighter than marble. If the idea that was in view when it was decided to use the Indiana oolitic stone is carried out the exterior of the building will be cleaned with steel brushes every fifteen years, and with each brushing it will become brighter. Why? Professor Collett says that it is because the stone is almost pure carbonate of lime and its impurity is organic matter—petroleum which is oxidized by exposure to air. The stone not only becomes brighter, but it grows harder and more durable with the lapse of time. It should be borne in mind that this is true of Indiana oolitic stone only.

TRANSVERSE STRENGTH AND ELASTICITY OF BUILDING STONES.

THOS. H. JOHNSON, C. E., M. A.

WHEN the Board of State House Commissioners for the state of Indiana assumed the duties of their office, one of their earliest acts was to investigate the relative merits of the different building stones that might be available for the new State House. In the course of these investigations they procured samples of many building stones, both from quarries in the state of Indiana and in other states. These samples were of two forms, cubes two inches each way and bars one inch square and fifteen inches long. Specimens of the two-inch cubes from each quarry were sent to Maj. Gen. Q. A. Gillmore to be tested for resistance to crushing, and his report upon the same was published by the Board of State House Commissioners in their "Report No. 6," January, 1879. The one-inch square bars were placed in the "Stone Room," in which the Board of Commissioners have accumulated a fine cabinet of samples of various building materials. Through the kindness of the Board the writer was furnished with samples of these one-inch bars, so far as there were duplicates in their collection.

At the time these tests were made the samples were about one year old, and were therefore thoroughly seasoned. They were tested under transverse strain and the deflection under each application of the load carefully measured. From each deflection so measured, and the load producing it, the Modulus of Elasticity was calculated, and the Modulus of Rupture from the load under which the specimen broke.

The term "Modulus of Elasticity" is used by writers on strength of material to designate the unit or standard of measure of the elasticity of a material, and is an arbitary and hypothetical quantity. All materials, however solid and rigid apparently, will stretch under tension, and shorten under compression, to an extent which may be measured if appliances of sufficient delicacy be used. Having found the rate at which any material will stretch under a given pull, we may calculate the force that would be necessary to stretch it to double its original length, supposing that rate of stretch could continue without breaking the material. The amount of that force, in pounds, would be the "Modulus of Elasticity." The same force that would stretch it to double its length would, if applied as a push or compression, shorten the piece to one half its length. Under transverse strains, the amount of bending depends on the amount of stretch along the bottom, and shortening along the top of the bar; and hence the measured deflections enable us to determine the modulus of elasticity of the material.

The modulus of rupture is the load that would break a beam one inch square, resting on supports one inch apart, the load being applied at the center.

The machine on which these tests were made was constructed from designs by the writer, and consists of an upright rectangular frame, with a double cross-bar a little above the center, on which are two knife-edge bearings on which to rest the test piece. These bearings are movable along the cross-bar so as to be readily adjustable to the length of the test piece. At the center of the test piece is a saddle carrying a stirrup on a knife edge, bearing over the center of the saddle. A dynamometer connects this stirrup to an eye in the top of a screw, which passes through a hand-wheel-nut attached to the lower cross-bar or sill of the frame. The dynamometer has a capacity of four hundred and fifty pounds, and is graduated to intervals of five pounds. By using a second pair of attachment rings for lighter strains, the dynamometer will read to single pounds up to fifty pounds. The accuracy of the reading of the dynamometer was verified before using by putting it in a Rehle testing machine and subjecting it to measured strains throughout the whole range of its scale. By this arrangement of saddle, dynamometer and screw, each test piece could be readily subjected to transverse strains of measured intensity.

To observe the deflections the following device was resorted to: A cord made of silk fibres, laid parallel and wrapped with fine metallic wire, was attached to the saddle and carried up through a hole in the cap of the frame, where it passed around a small pulley on a horizontal spindle, upon one end of which was a small plate glass mirror. From this spindle the cord passed along the top of the frame, to a pulley at the side, from which the end of the cord hung free, and carried a counterweight which was adjusted to balance the weight of the saddle, dynamometer and their attachments, thus relieving the test piece of all strains excepting those applied by the screw and registered on the scale. The counterweight also served to hold the cord taut, and insure a proper motion of the mirror, following the deflection of the test piece. The amount of the deflection is measured by reading, through the telescope of an ordinary transit or level, a graduated scale as seen in the mirror. This scale is set up at a distance of ten feet from the mirror, and admits of reading the deflections accurately to $\frac{1}{10000}$ of an inch.

In making the tests the piece to be tested was first accurately calipered for dimensions and placed on the bearings. The wheel was then turned until the index of the dynamometer began to move, showing that the slack was taken up and that the test piece began to feel the strain. The whole was then slowly backed off until the index just touched zero. In this position the mirror was then adjusted to show the zero of the deflection scale on the cross-wire of the telescope. Strains were then applied, beginning generally with ten pounds, and increasing by ten pounds intervals until rupture occurred, the deflection at each increase of strain being observed by an assistant at the telescope.

The results are appended both tabular form and in diagram.

As the pieces differed in their sectional dimensions, it was necessary for more ready comparison, especially in the diagram, to correct the recorded deflections, so as to get the deflections due to standard dimensions of one inch square. This was done in accordance with the established principle that the reflection is inversely proportional to the *breadth* and to the *cube of the depth.* These corrected deflections only were used in constructing the diagram, and are given in the table in the several columns headed "*corr.*"

The modulus of rupture was calculated from the formula

$$R=\frac{3\,P.\,l.}{2\,b.\,d.^2}$$

in which R is the modulus of rupture, P the load producing rupture, l length, b the breadth and d the depth of the test piece, all in inches. In this equation the weight of the test piece is neglected; but the error arising from this is very small and does not materially affect the results.

The modulus of elasticity was calculated from the equation

$$E=\frac{P.\,l^3}{4\triangle.b.d^3}$$

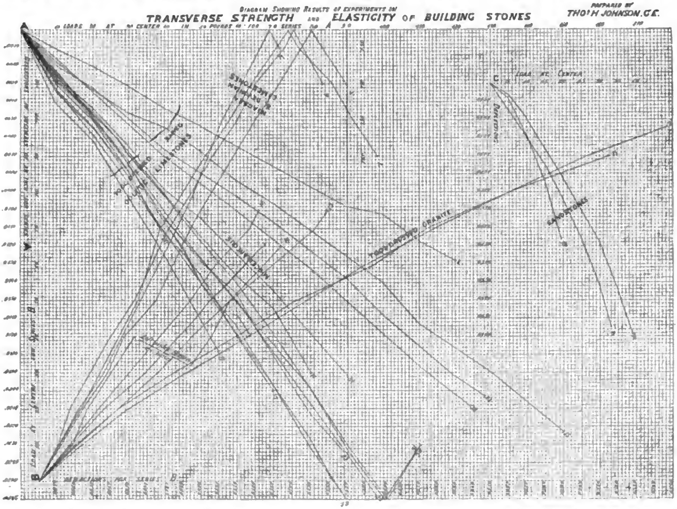
in which E is the modulus of elasticity, $\triangle$ the deflection caused by a load P, and the remaining factors the same as before.

The diagram sheet shows three groups of lines having their origins of co-ordinates respectively at A, B and C. The group A embraces all experiments on oolitic limestone, in which the quarry beds were horizontal, and the mode of preparing the sample known Group B embraces all other tests except sandstones, in which the loads were so small and the deflections so great as to require a different scale of platting in order to keep them within the limits of the paper. They are shown in group C.

Group B contains four experiments on oolitic limestones, Nos. 3, 18, 19 and 33. Nos. 3 and 33 were sawed vertically from the quarry ledge, making the beds at right angles to the axis of the bar, like a strip sawed off the end ot a board. With Nos. 18 and 19 the mode of working was unknown.

RESULTS.

A very interesting result of this series of experiments is the apparent relation indicated between the *resonance* of the samples, and their *strength* and *elasticity*. I use the word "indicated" because it is impossible to get an exact measure of the resonance, or to describe it except by the use of such relative adjectives as "dull," "clear," etc., which have no exact meanings, and are incapable of mathematical comparison.



Each bar before testing was held vertically, lightly clasped between the thumb and finger, near one end, and then struck with some hard object, usually another piece of the same stone. Some of them (notably No. 1) would give out a clear, ringing, musical note. Others, such as the sandstones, would respond with a dull thud, like dried clay or putty. Between these extremes there were various degrees of resonance which could only be described in the crude way mentioned.

Prof. John Collett, ex-State Geologist, while a member of the Board of State House Commissioners, had repeatedly pointed out the difference in resonance of the different samples, and had urged its importance as an indication of their relative strength. Sound waves occurring singly, or at irregular intervals, impress the senses as *noise*, while regularly recurring waves are recognized by the ear as *music*.

In order that a body shall possess the property of resonance two conditions are necessary. The particles composing the material must be so intimately united as to transmit from particle to particle the force of the blow; and there must be sufficient elastic recoil and re-recoil to produce sustained vibration. The same physical properties, therefore, which give a material strength and elastictity, should also give it resonance in a nearly proportional degree. In the absence of a measure of the resonance, I may say that throughout this series of experiments, as nearly as the ear could estimate it, the resonance of each piece tested was proportional to the modulus of elasticity as found from the test.

Passing from this to the more exact results, we find the most striking feature to be the very marked difference between the sawed and tool-dressed specimens of oolitic limestone. Indeed, when attention is called to the subject, it becomes apparent that such difference must occur.

It is well known that a stone, however large, may be broken by striking a sufficient number of blows with a hammer, along the line where it is desired to break the stone. In this process the force of the blow is expended in gradually weakening the cohesion of the particles in a line following the direction of the blows. This weakening is increased by each successive blow, until finally rupture occurs.

If large stones may thus be broken, it is evident that the many blows, needed to dress a small sample by hand, must largely affect its internal condition. The blows, too, are uniformly distributed over all faces of the samples, so that all parts of the interior are equally affected. The small dimensions of test pieces (usually 2-inch cubes, for comparison, and in this series 1-inch bars), renders it certain that the disintegrating effect of the tool penetrates throughout the mass. It should not, therefore, be matter of surprise that the tool-dressed samples show lower results than the sawed samples.

It may be objected that the samples sawed and tool-dressed are from different quarries, and that the differences may be due to inherent differences in the stone, and not to the difference in the mode of working. But a glance at the diagrams will show that the two classes separate themselves into groups too distinctly marked to admit of such an explanation. If the difference between the groups fell within the range of difference between individual specimens in each group, this objection might have force. But such is not the case; the highest of the tool-worked does not reach the lowest of the sawed samples.

In order to show that the tool-dressing has in like manner affected the 2-inch cubes sent to Gen. Gillmore, the crushing strength as reported by him is given in the last column of the table.

It should be here stated that the cubes and bars sent from each quarry were, in each case, prepared alike, so that where my samples were sawed Gillmore's were sawed, and where mine were tool-dressed, his were also tool-dressed, and his reported results have been classified on this assumption.

The average results of the two groups are placed in the following table, for more convenient comparison :

Average Results from Experiments on Sawed and Tool-Dressed Samples of Oolitic Limestone.

	MODULUS OF		
	Rupture.	Compression.	Elasticity.
Sawed	2,338	12,675	4,889,48
Tool-Dressed	1,477	7,857	2,679,475
Ratio of tool-dressed to sawed	63%	62%	55%

The close agreement between these ratios is remarkable.

These experiments show that owners of quarries who desire their stone to be properly set before the public should never allow tool-dressed samples to be submitted for testing purposes, and that the results of tests heretofore published have no value for purposes of comparison, where the mode of preparing the samples is unknown.

Referring again to the diagram, it will be noticed that the lines representing the sandstones and the tool-dressed granites approximate to the form of the parabola, while the sawed oolitic limestones, together with the Niagara and Devonian group are approximately straight lines. The tool-dressed oolitic limestones show, in some instances, a tendency toward a straight line, and in others a tendency toward the parabolic form.

The straight line means that the elasticity is constant and unimpaired up to the instant of rupture. The parabola means that the elasticity is diminishing with each successive application of the load. In both cases the results are unique. With all other materials that have been made the subject of experiments, it is found that the line representing the test is approximately straight for the first portion of its length, and parabolic for the last portion, the change from the straight line to the parabola being usually well defined, and marked by a sharp cusp, or point on the line. This point is called the *"limit of elasticity,"* and it marks the load under which the elasticity of the specimen first becomes impaired. With the sawed limestones it would seem that the limit of elasticity is greater than the tenacity, and that the stone fails by tension along its lower surface before its elasticty has been impaired. With all those cases which show the parabolic form, the elasticity has been impaired by the tool-dressing, so that the limit has been passed before they were subjected to strain. The sandstones, however, were sawed, and the parabolic form developed by them was not the effect of tools, but shows a low degree of elasticity as inherent in the stone itself, and which renders them not well adapted for beams or lintels.

The oolitic limestone, which forms the leading feature of the foregoing series of experiments, is so little known beyond the immediate neighborhood where it is quarried, that it may not be out of place to give here a fuller description of it and of its character as a building stone.

Geologically it belongs to the St. Louis group of the subcarboniferous period and has been formed from the crushed remains of the marine shells, corals, etc. These have been pulverized to the condition of fine sand ; their soluble impurities washed away, and their insoluble residue reunited into solid rock by a deposit of carbonate of lime as a cementing material. Its structure is, therefore, that of a close grained, compact sandstone, while chemically it is a limestone of rare purity.

Like the sandstones, it works freely under the tool, while the homogeneity of its particles and binding material enables it to be worked to a clean, sharp arris. Like the sandstone, also, and unlike other limestones, its formation in the ledge is massive and solid; not stratified with clay partings. It has no well defined cleavage in either direction, and is of nearly equal strength whether on "edge" or on "bed." The formation is generally about forty feet in thickness, and presents a solid face, from which the quarryman may choose his dimensions unrestricted by any conditions save his ability to handle and transport the blocks. The Egyptian obelisk or the mighty stones of Baalbec could be readily surpassed in these quarries.

The Indiana Geological Report for 1878 gives analyses of samples from different quarries along the out-crop of the formation, from White river, in Owen county, to the Ohio river in Harrison county, showing a remarkable uniformity in its composition. All the samples show from 95 to 98 per cent. carbonate of lime, which is indestructible by ordinary atmospheric influences; while ferric oxide and alumina, to which most perishable stones owe their failure, occur here only from 0.34 to 1.00 per cent. This is a degree of purity rarely found.

In so far as durability can be inferred from chemical analysis, the oolitic limestone gives every assurance of permanence, which is further attested by the perpendicular and unworn aspect of all exposed faces along the out-crop and by its retention of tool-marks after forty years of exposure in buildings. It is only slightly absorbent of moisture; is perfectly free from saltpeter or other efflorescent salts; and its high degree of elasticity enables it to resist, without injury, the otherwise destructive effects of freezing the absorbed moisture, and of unequal expansion or contraction from sudden and unequal changes of temperature.

Its rich gray color, close and uniform texture, and facility of working, both by hand and by machinery, makes it extremely valuable for architectural purposes, and its assured strength and durability makes it especially desirable for all permanent engineering works. When it has become better known and appreciated abroad, it will form a prominent item in the commerce of the state.

STONE AND MARBLE OF GREAT BRITAIN.[*]

THE materials that come under the designation of stone as used for building purposes, consist either of the rocks belonging to the earlier geological formations (such as the various descriptions of granite), or of deposits that are the result of the decomposition of such formations, as represented by those that are of a sedimentary character. These sedimentary rocks may be classed under two heads, sandstones and limestones, some of them partaking of the nature of both, such as the Mansfield redstone, which is a siliceous magnesian limestone.

Of the sandstones there are a great variety, some of them being of too hard and too coarse a texture to be available for buildings the character of which necessarily entails a considerable amount of ornamental work, but they afford excellent material for plain heavy masonry, where strength and durability are the main points to be considered. We have examples of such material in the gray sandstones of Dundee and Arbroath, which have been much used for paving in Edinburgh and Glasgow, and of the coarser varieties in that which is known as Bramley Fall stone, used for Kirkstall Abbey, built in the 12th century, the name being derived from the quarry in the neighborhood of Leeds, whence this description of stone was first obtained. This quarry has been closed for some time, but the original name is retained, and now represents a quartzose sandstone, varying considerably in its texture, belonging to the millstone grit formation, and obtainable in very large blocks from a number of quarries in Yorkshire, Lancashire and Derbyshire. It is chiefly used for engineering works, such as engine beds, dock walls and foundations, being especially adapted for massive work of every description where large blocks are required.

The finer descriptions of sandstone come under the designation of "Freestone," a term that has no very distinctive meaning, but one which is commonly employed when speaking of any stone, whether it be a sandstone or a limestone, that is capable of being easily tooled, quite irrespective of its chemical composition. There is an ample supply of excellent sandstone for general building purposes both in England and Scotland. In England this is especially the case as regards the conutries of Lancashire, Yorkshire and Derbyshire, in which there are a number of quarries yielding a very durable material, which is, at the same time sufficiently soft to admit of being easily worked with a chisel.

The stone from the Darley Dale and Knabb quarries, in Derbyshire, has been largely used in Manchester, and it would not be easy to find a better test of the durability of stone than subjecting it to the influence of such an atmosphere as that of the city of Manchester. The New Stanton and Coxbench quarries yield an excellent material for building purposes, some of the stone from New Stanton being also suitable for grindstones.

Of the Yorkshire sandstones, amongst those that have been longest known may be mentioned the Hare Hills and Park Spring stone, which have been extensively employed for many years in London and in various parts of the country.

The Scotgate Ash quarries, near Pately Bridge, yield an excellent building stone, some of the beds affording a material suitable for landings. A fine-grained sandstone is obtained near Sheffield, which has few rivals as regards its properties as a grindstone, and in the district which lies between Bradford and Halifax are obtained in large quantities the flagstones for which Yorkshire possesses such a high reputation. The red Corschill stone from Annan, in Dumfries, is one of the finest of our red building stones. It is uniform in its texture, of a deep red color, which is but little liable to alteration. This stone is peculiarly adapted for use in conjunction with bricks or terra-cotta, and has been employed with good effect for several buildings in London and its neighborhood.

One of the finest sandstones is that known as the Craigleith stone, which has been very extensively used in Edinburgh. It is a close-grained compact stone, consisting almost entire of silica, the particles of quartz sand being bound together by a siliceous cement, the total silica it contains, as shown by analysis, amounting to 98 per cent. The permanent character of this stone has been thoroughly established; exposure to the weather for 200 years having in some cases scarcely produced any effect upon it, but it is questionable, however, whether the stone now obtainable under this name possesses the excellent properties of the original supplies. The Minera stone from near Wrexham, in Denbighshire, has been largely used in Liverpool and Manchester, and was employed in London for the building near the Mansion-house occupied by the National Safe Deposit Company.

At Grinshill, near Shrewsbury, there are quarries which yield a fine-grained building stone, of which there are three varieties, white, yellow and red, which has been extensively used in Liverpool, Manchester and Birmingham, and towns in the midland counties, as well as in London. This stone was employed for many of the churches in Shropshire, including Battle church, standing on Shrewsbury battlefield, and has proved to be a good weather stone.

The Prudham stone, from the neighborhood of Newcastle, has within the last two or three years been introduced into London, and from the condition of this stone, which was employed for buildings in Woolwich dockyard some forty years ago, it may (if obtained from the same beds) be expected to prove a durable stone.

Uniformity of texture is an important consideration, more especially as regards sandstones, inasmuch as some of this class contain portions differing in character from the mass of the stone, showing a tendency to weather at a different rate. Sometimes such portions are less liable to alter than the mass, and the stone presents a more or less pitted appearance.

Limestones, as a class, are quite equal in importance to the sandstones as regards the number and variety of the beds yielding an excellent material for building purposes. They differ widely from each other as regards their chemical composition, from white marble, which is pure carbonate of lime, to the magnesian limestone, in some descriptions of which the proportion of carbonate of magnesia is nearly equal to that of the carbonate of lime. Marble is generally regarded as the result of carbonate of lime having been subjected to intense heat in a confined space, where there was no opportunity for the escape of the carbonic acid, and consequently under great pressure. It is a highly crystallized carbonate of lime of a density equal to that of granite, weighing about 170 pounds per cubic foot.

Although we have not in England the beautiful white statuary marble of Italy, nor such deposits as would be required for a cathedral like that of Milan, yet we have in Derbyshire and Devonshire, marble that leaves little to be desired as a material for ornamental and decorative work.

The beautiful black marble from Ashford, in Derbyshire, has been worked for forty years, the beds varying in thickness from three to nine inches. It has been extensively used for ornamental work in church buildings and public edifices, of which we have an example in the bases and caps of the balustrading around the ladies' gallery of St. George's hall, Liverpool. The other varieties of marble from these quarries, as well as those from Hopton-wood, in Derbyshire, have been largely employed for ecclesiastical as well as other decorative work throughout the country. The Devonshire marble can be procured in very large blocks, and to such an extent is this the case that a polished marble tank, weighing when finished nine tons, cut out of a single block, has been supplied from the Oreston quarries near Plymouth. The marble columns at the Home and Colonial Offices were also obtained from these quarries.

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[*] A lecture delivered before the British Society of Arts, by W. Y. Dent, F. C. S., E. I. C.

There are several other limestones that are of such a highly crystalline character as almost to entitle them to be classed with marbles, of which the Nidderdale limestone may be taken as an example. By far the larger portion of the limestone ordinarily used for general building purposes is derived from the beds of the oolitic system, so named from the particles of some of these beds being more or less of a granular character, bearing resemblance to the roe of a fish. This appearance is not of a marked character in many of the stones belonging to the oolitic series, but in some of the beds of Bath stone, and more particularly in the Ketton stone, it is too evident to escape the notice of the most casual observer. It is supposed that this appearance is due to the stone having been formed from the disintegrated particles of former limestones which have become rounded by attrition and deposited in a granular condition, or the carbonate of lime has been deposited upon some particle of sand or fragment of shell which was kept in motion by flowing water saturated with carbonate of lime. Such a production of oolitic grains may be observed in process of formation in the springs of Carlsbad. The most important of the building stones belonging to the oolitic system is undoubtedly that which is known as Portland stone, which may be regarded as the type of a good limestone for ordinary building purposes. It has been used more extensively than any other description for the buildings of London. St. Paul's Cathedral, Somerset House, the National Gallery, the Custom House, the Postoffice, the Royal Exchange, and the New Law Courts, have all been built of this material, and experience has proved that (when carefully selected) it is one of the best adapted for resisting exposure to the baleful influence of a town atmosphere. Fortunately for its reputation, great care has generally been exercised in preventing any inferior stone being employed. Sir Christopher Wren had the stone for St. Paul's Cathedral quarried and exposed to the air for three years before it was brought to London, a full opportunity being thus afforded for rejecting any blocks that exhibited signs of inferiority; the stone used for the Royal Exchange also underwent a special inspection at the quarries.

There are numerous quarries in the island of Portland, and a series of beds, only a few of which yield a really good material. Taking the Waycraft quarry as an example, we find that after sinking to a depth of 25 feet through several strata of but little value, and known by various local names, the Roach bed, two feet six inches in thickness, is reached. The stone of this bed is shelly and full of cavities, and consequently cannot be used for building purposes where a good facing stone is required; it is, however, hard and durable, and is employed for underground work, its money value not being more than one-half that of the best Portland stone. Below this is the finest bed of the whole series known as the Whit bed, nine feet six inches in thickness; and after sinking eight feet deeper, through stone of little value, termed "curf," the lowest of the series, or base-bed, is reached, a name that has sometimes been converted into "best bed," which is somewhat misleading, inasmuch as, although sometimes preferred by masons, it differs slightly in its character from the Whit bed, and is considered inferior to it in durability. It also sometimes contains irregular bands of flint. The thickness of the several beds varies considerably in different quarries. This stone contains 95 per cent. of carbonate of lime, the hard crystalline particles of which it is composed, as well as the material that binds them together, consisting of carbonate of lime.

The next stone in importance belonging to the oolitic system, is that obtained from several quarries in the neighborhood of Bath, with which everyone is more or less familiar under the name of Bath stone. The several beds vary as regards the character of the stone they yield, perhaps to a greater extent than is the case with any other description, and unless great care is taken in its selection, it will generally be found to prove a failure if exposed to such an atmosphere as that of London. At the same time examples are not wanting of its exhibiting as much durability as other descriptions of limestone, and in one instance where it has been used along with Portland stone in the same building, in which special care was taken in its selection, it exhibits fewer indications of decay than the Portland. The vast trade that is now carried on in Bath stone may be said almost to have commenced with the opening of the Great Western railway, although the stone has for a long time been a favorite with builders, having been employed since the 12th century.

The stone imported from Caen, in Normandy, was introduced into this country shortly after the Norman conquest, and was extensively used in building churches down to the middle of the 15th century. Its fine, soft, even texture, renders it peculiarly suitable for ornamental work, and there is no better stone for internal decorations involving elaborate carvings. It is not, however a good stone as regards its capability of resisting the exposure to atmospheric influences, and is quite unsuitable for the exterior of buildings erected in large towns. With but few exceptions, when exposed to a town atmosphere, it has proved a complete failure, its defective condition having had, in some instances, to be concealed by paint.

The Doulting stone, obtained from the beds of the lower oolitic formation at the base of the Mendip hills, in Somersetshire, resembles Portland as regards its composition, and also with respect to its density and porosity, and although it more resembles Bath stone in appearance, it is superior to it in quality. This stone was used for building Glastonbury Abbey, in the 12th century, and for Wells Cathedral.

Among other stones belonging to the same class may be mentioned the Ancaster stone, from near Grantham in Lincolnshire, which has been largely used in that and the neighboring counties, and to some extent in London. The stone from Casterton in Rutlandshire was used for the cathedrals of Norwich and Ely, and in building some of the colleges at Cambridge. The Clipsham, stone, from the same county, was employed in the restoration of the cathedrals of Ely and Peterborough is similar to what was formerly known as the Barnack stone, which acquired considerable reputation as a good weather stone. The Ketton stone, from near Stamford, has already been alluded to as possessing a very marked granular appearance, exhibiting its oolitic character to an unusual extent. It is a very excellent stone (of which we have a good example in the Church of St. Dunstan's, Fleet street,) and is somewhat peculiar in that it possesses but little if any distinctive line of bedding.

The Headington stone, from the neighborhood of Oxford, has been largely employed for many of the colleges and churches in that city, the condition of which does not afford any favorable evidence of the durability of the Oxford oolites, much of the stone of the colleges and other buildings in Oxford exhibiting signs of exfoliation and decay. One of the better class of the Oxford oolites is the Charlbury stone, used for the Central Barracks, Oxford. A stone has been largely employed in Oxford for several years past which is obtained from Milton, near Chipping Norton; it has acquired a favorable reputation with several well known architects, and seems likely to prove more durable than most of the stone that has been generally used for the colleges of Oxford.

The stone which is known by three different names, Tisbury, Chilmark, and Wardour, is obtained from quarries in the neighborhood of Salisbury, the original Tisbury quarry being now closed. It differs in its composition from the limestones before mentioned, inasmuch as it contains ten per cent. of silica, which partly exists in minute particles forming nuclei, round which carbonate of lime has been deposited, and partly as a crystalline matrix, forming the binding material of the stone. Salisbury Cathedral was built of this stone, and it is now being used for the repairs of Westminster Abbey. The Kentish rag is a dense, hard, and very durable limestone belonging to the green sand formation, largely employed in the South of England forts and harbors. It is obtained from quarries in the neighborhood of Maidstone, where it occurs in layers from six inches to two feet in thickness, with alternating bands of a soft siliceous limestone, locally termed hassock; it is employed for many of the picturesque country churches in Kent, the hassock being used for the interior portion of the walls.

Of the siliceous limestones, the finest example is that known as the Mansfield stone, of which there are two varieties, the white and the red, both of which contain nearly 50 per cent. of silica, associated with variable quantities of carbonate of lime and carbonate of magnesia. This stone, more particularly the red variety, has deservedly obtained high reputation for the beauty and uniformity of its color, and the fineness of its texture.

THE CRUSHING STRENGTH OF STONE.

PROF. IRA O. BAKER, UNIVERSITY OF ILLINOIS.

THE readers of this journal are doubtless interested in the method employed to determine the relative merits of different stones. The three qualities most important in a stone suitable for structural purposes are strength, durability and beauty. Ordinarily stone is used only where it will be subject to a force tending to crush it. In these days of tall monuments, long-span bridges, and high buildings, the ability of stone to resist the immense loads sometimes imposed upon it becomes important.

The crushing strength of a stone is generally tested by applying measured force to small blocks until they are crushed. The results for the crushing strength vary greatly with the details of the experiments. Several points, which should not be neglected either in planning a series of experiments, or in using the results obtained from them, will be taken separately, although they are not entirely independent.

The nature of the material in contact with the stone while under pressure is a matter of great moment. If the materials which press upon the top and bottom of the specimen are soft and yielding, and press out sideways, they introduce horizontal forces which tend to tear the stone asunder, and therefore materially diminish the apparent crushing strength of the stone. Formerly it was the custom, when one stone laid upon another had to sustain a heavy pressure, to place a sheet of lead between them "to distribute the pressure uniformly." The object was all right, but the result was that the lead squeezed out sidewise, causing the stone to fail by splitting instead of crushing. On the other hand, if the pressing surfaces are hard and unyielding, the resistance of these surfaces add considerable to its apparent strength. Steel, wood, leather and lead have been used as pressing surfaces. Under certain limitations, as noted below, the relative crushing strengths of stones with these different pressing surfaces are 100, 89, 65 and 62, respectively. For example, if a specimen of stone stood a pressure of 10,000 pounds per square inch when pressed between two thick pieces of steel, it would stand 8,900 pounds if pressed between two pieces of wood; 6,500 pounds if pressed between leather, and only 6,200 pounds if sheets of lead intervened between the block of stone and the two plates of the testing machine. However, the following exceptions to the preceding general rule must be noted. With stones of great hardness and toughness combined, steel and wood give approximately equal results. The reason is obvious. With very soft stones the power of the stone to resist crushing is overcome before sufficient pressure has been developed to bring the action of the wood fibers on the stone fairly into play, and consequently the steel and wood again give the same result.

The thing to be sought is to secure the same conditions in the experiments that the stone is under in the masonry. It would at first seem that the pressing surface should be of the same kind of stone as the specimen to be tested. But the surface must not be continuous. One stone is seldom placed directly over another, since, necessarily for the strength of the masonry, we introduce what is called bond. Usually, then, there are one or two joints under each stone, which may or may not be filled with mortar. A wooden cushion, one-quarter inch thick, placed above and below the test specimen must nearly represent the conditions actually existing in the wall, because it spreads mainly in one direction, and but very little transversely thereto.

The crushing strength of stone is generally obtained by compressing cubes of the material. Why a cube? In good masonry stones of greater hight than the breadth of the bed are never used, therefore, the experiments should not be made on objects whose hight is more than the breadth. The compressive strength of slabs, *i. e.*, of pieces wider than high, is much greater than that of cubes of the same material, but experiments show that slabs do not give a definite and easily recognized point of failure. The cube allows quite sufficient opportunity for the easily recognized and angular breakage of stone, and hence is always employed in such experiments. As was pointed out in a former article, the results of experiments on the crushing strength of blocks of stone are valuable only for comparing different stones, and give but a faint idea of the strength of masonry structures built of that stone.

How large shall the specimen cube be? Although the cube is the form of test specimen generally adopted, there is not equal unanimity as to size of the cubes; hence it is necessary to inquire into the effect of the size of the specimen upon the apparent strength. This inquiry is necessary before we can compare results by different experimenters; and it is also important as indicating the relation between the strength of the test specimen and that of the block of stone as laid in the wall.

Gen. Gillmore made some experiments upon cubes of stone varying from ¼ inch to 4 inches on a side, with the result that the relation between the crushing strength and the size of the cube can be expressed by the formula

$$y=a\sqrt[3]{x},$$

in which y is the total crushing pressure in pounds per square inch of bed area, a is the crushing pressure of a 1-inch cube of the same material, and x is the length in inches of an edge of the cube under trial. For two samples of Berea (Ohio) sandstone, a was 7,000 and 9,500 pounds respectively.

According to tests made with the large and accurate testing machine at Watertown (Mass.) Arsenal on cubes of neat cement, cement mortars, concrete, and Haverstraw sandstone, the strength of cubes appear to be independent of the bed area. Various other experimenters have uniformly obtained like results. There is no sufficient reason for believing that the strength of cubes of stones varies with the size of the cube. The experiments which indicated a variation of strength with size were doubtless in error, owing probably to the friction of the machine.

Shall the specimen be dressed by hand or sawed out? It is well known that even large blocks of stone can be broken by striking a number of even comparatively light blows along any particular line; the force of the blows gradually weakens the cohesion of the particles. This principle finds application in the preparation of test specimens of stone. If the specimen is dressed by hand, the concussion of the tool greatly affects its internal condition. The disintegrating effect of the tool in dressing is less with large than with small specimens. With 2-inch cubes, the tool-dressed specimen usually shows only about 60 per cent. of the strength of the sawed sample. The sawed sample most nearly represents the conditions of actual practice. Here is a limit to quarrymen when preparing specimens of their own stone for competitive tests, or when comparing the results of different experiments. Possibly the difference in the effect of tool-dressing between small and large cubes may account, in part, for the apparently greater strength of large cubes obtained by some experimenters.

What is the compressive strength of stone? The following table gives the compressive resistance of the principal classes of building stones employed in the United States.

Crushing Strength of Cubes of Stone.

KIND OF STONE.	ULTIMATE CRUSHING STRENGTH.			
	Lbs per square in.		Tons per square ft.	
	Min.	Max.	Min.	Max.
Trap Rocks of New Jersey	20,000	24,000	1,440	1,730
Granite	12,000	21,000	860	1,510
Marble	8,000	20,000	580	1,440
Limestone	7,000	20,000	500	1,440
Sandstone	5,000	15,000	360	1,080
Good Brick	5,000	23,000	360	1,600

What is the crushing strength of slabs? It is well known that prisms thinner than high are stronger than cubes, but since the crushing strength of slabs is of no particular importance, and since an immensely strong testing machine is required to determine the crushing strength of slabs, but few such experiments have been made on stone or any other material. However, the few experiments made with the great United States testing machine at the Watertown (Mass.) Arsenal show that the strength per square inch of stone prisms one-fourth of a cube high is two to three times the strength of a cube of the same material.

In all the preceding it has been implied that the pressure was applied uniformly over the top and bottom surfaces of the specimen being tested; but it is frequently important to know the crushing strength when the pressure is applied only to a part of the surface of the material. In the latter case, the material not directly in the line of pressure greatly reinforces that which is. For example, when a cube is compressed, the central portions bulge out sidewise and more or less dish-like pieces are detached from the sides, but when the pressure is applied to only a small part of the upper surface, the lateral support of the adjoining material prevents the detachment of these dish-like pieces and therefore increases the crushing resistance of the material. This principle is established by some experiments made in England on iron. Pressure was applied by a steel die one-half inch square to the middle of an iron disk one inch in diameter and three-fourths of an inch thick. The iron was very soft, and in the form of a short prism or a cube, it would probably not have stood more than 30,000 or 40,000 pounds per square inch; but when the pressure was applied to one-fourth of a square inch in the middle of the disk a pressure of 54,000 pounds was required to produce a perceptible indentation, and a pressure of 90,000 pounds per square inch produced only an indentation of $\frac{1}{64}$ of an inch deep. The area of contact between the locomotive and car wheels and the rails varies from one-fifth to one-fourth of an inch, and the pressure is at the rate of 60,000 to 70,000 pounds per square inch which is considerably more than the crushing strength of short prisms of the materials, and yet neither the wheels nor the rails are *crushed*. They do wear away, but this has nothing to do with the phase under discussion.

Clay, which for years has safely supported one and one-half to two tons per square foot (25 pounds per square inch), when in the form of isolated cubes crushes under a prism of four to eight pounds per square inch.

The fact that lateral support greatly increases the resistance to crushing is very important in proportioning the foundations of structures resting upon rock or the stiffer soils. According to the text-books and manuals, the safe bearing power of rock in its native bed is only one-tenth of the load which would crush cubes of the material, thereby making no allowance for lateral support by the material not under pressure. We have just seen that in experiments on iron a load two times, and possibly three times, the load which would crush a cube produces only a very light indentation. In proof that this experiment is applicable to the case in hand reference need only be made to the fact that the rocks deep down in the interior of the earth are not crushed under the enormous loads of the mass of earth above them. It is safe to say that almost any rock in thick layers in its native bed will bear the heaviest load that can be brought upon it by any masonry construction.

NEW COMPOUND FOR HARDENING WALLS.

A patent has been granted for a waterproof compound adapted to be applied to the floors and walls of buildings to prevent the access of water and dampness, and which will also withstand extreme and varying temperatures of air, and which will be practically indestructible. The composition consists of the following ingredients, combined in substantially the proportions stated, viz:

New Zealand (or Portland) cement, 100 pounds; cream of tartar, 3 ounces; pulverized ivory, 1 ounce; quicksilver, 1 ounce; isinglass, 4 ounces; marble dust, 5 pounds; sand, 200 pounds; rain water, 1 pail.

In compounding the ingredients a small quantity of cement, for instance, one pound, is mixed with the cream of tartar, quicksilver and isinglass and water enough to make a very thin paste, and the composition is let stand about twenty-four hours. If the weather be cold the composition should stand in a warm place. The remainder of the cement, the pulverized ivory, marble dust and sand are mixed dry, and the standing compound is thereupon added, together with enough rain water, about half a pail, to produce a plastic mass capable of being readily laid with a trowel or similar implement. After the compound is laid upon a suitable foundation, such as wood, earth, brick or metal, it becomes very hard, equal to steel, and capable of a very high polish.

CORRESPONDENCE.

CORRESPOND WITH US!

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

Lithographic Stone in Georgia.

To the Editor of Stone.

Sir: I see in your issue of September quite an article on lithographic stone. In 1887 I was casually considering some lands South, among others a tract of 840 acres near Ringgold, Catoosa county, Ga., and off railroad, and some 20 miles from Chattanooga, Tenn. I had been informed of its possessing a fine quarry of very superior grade of light bluestone; also a fine grade of iron ore. A renewal of talk resulted in closing the deal in July last.

I had no idea of making any investigation of this quarry until October, but some Cincinnati folks, so I am informed, "dropped onto it," and also some other parties, and I am told that in the past ten days specimens have been sent North, to Chicago and elsewhere. The quarry is on my tract. Business will not admit of my devoting time beyond examination in the fall (October or November) to quarry, but I have several parties considering its purchase, as there is a 250-acre farm, with large orchards, etc., connected with it, but from their talk and anxiety, I guess the farm is only a pretext. The main object is, if it proves as good stone as the quarry in Overton county, Tennessee, owned by the Louisville Lithograph Stone Co. I shall sell it all or part, as I am too much crowded with other matters.

We have just as good stone and mineral as abroad, and I think that the American flag waves over just as good a country. I have seen the Old World, and traveled over much of it. America is my mother, and is good enough for me.

Your truly, Geo. M. Cartwright.

Lansing, Mich., Sept. 5.

Cleaning Tombstones.

To the Editor of Stone.

Sir: I send you clipping from the Pittsburg *Dispatch*. It will amuse if not instruct. I presume the public in general is crammed full of just such absurdities, but are not always in a position to recognize their falsity:

"Do you ever have orders to clean old tombstones?" asked a *Dispatch* reporter at one of the largest marble-cutting shops in Pittsburg yesterday.

"Oh, yes, that is a big part of every monument builder's business," replied the proprietor. "Until the introduction of natural gas as fuel, Pittsburg and Allegheny had the name of having the dirtiest tombstones and monuments in the world. The smoke from the iron mills flooded in clouds over Allegheny, St. Mary's and Uniondale Cemeteries, and begrimed all marble. Tombstones in these cemeteries used to actually get black. The business of cleaning them flourished then. But natural gas has changed all that. Still we are called upon frequently to shine up headstones and shafts which are age stained or soiled by the elements. If care is taken like this the life of a tombstone in this climate can be prolonged 30 years longer than if it was left to itself."

"How do you clean tombstones and not spoil the enamel?"

"By a very simple process. We mix one-fourth of a pound of soft soap with the same amount of pounded whiting; one ounce soda and a piece of stone blue the size of a walnut. We boil these together for a quarter of an hour, and while hot rub it over the tombstone with a piece of flannel and leave it on 24 hours. Then we wash this off with clean water and polish the marble with a piece of coarse flannel.

"I originally got this recipe from an old colored woman in Baltimore. Marble steps to houses are very popular there, and she had made the mixture during a lifetime to clean the steps. This old lady also told me what she said was a good way to paint on marble, so that it won't rub off. It was to use the ordinary gold paint sold by art stores consisting of powdered brass and oil of turpentine. But all such paints, I have found, will wash off in time."

We are very much pleased with Stone, and trust success will crown your further efforts.

Yours truly, Wm. W. Windsor.

Allegheny City, Pa., Sept. 7.

Lifting Heavy Stones.

To the Editor of Stone.

Sir: We are furnishing some platform stone 18 feet long, 7 feet wide, and 8 inches thick for parties in New York. Have four of them ready; they weigh between seven and eight tons apiece. I was very much puzzled for some time how to get them raised high enough to get trucks under them. We have a plan now that works first-rate, and will give it for the benefit of others who might get in the same dilemma. Two men, a big crowbar, and plenty of blocking is all the outfit necessary to raise any stone high enough to put a wagon under. First center the stone, then make two lines across the stone 18 inches from center of its longest dimension. The lines will be three feet apart. Then pry up one end as much as you can, and block it up under the line nearest your lever or bar. Then pry up the other end until opposite end touches the bed where the stone lies. Block up under line nearest bar, then pry up other end, and block up under line nearest lever, and continue this business until the stone is high enough. At first the stone rises slow because it will not tip much, but after a little time there can be six or eight inches raised on an end. The principle thing is that the stone helps lift itself, all that is really pried up is the weight of three feet between the lines in center of stone.

Yours Truly, J. G. Barger.

Goodyear's, Cayuga Co., N. Y., Sept. 11.

Workmen Want Places.

To the Editor of Stone.

Sir. I received a copy of your last issue, and consider the work splendid thing for the trade in general. I have carried on business here for a number of years, and were I to stay, would subscribe at once for it, but myself and two sons are thinking of going to some Southern quarries and go to cutting at present. We have written to three companies we saw advertised in your journal to see about a job, and made mention of the fact to them, and as soon as we get located anywhere will take your monthly. I have cut both marble and granite in plain work. My boys are good workers, and good on plain work, especially on hammered work. Can give the best of references. I am a good agent on the road, or can handle work in any form or shape. Would be a good man to take charge of a shop or a lot of men, and I am not afraid of work myself.

Yours Respectfully, S. S. Paul.

Weedsport, N. Y., Sept 11.

AN UNEASY QUARRY.

In 1873 there was read before the American Association for the Advancement of Science, a paper from which we make the following extract. The quarry in question is situated at Monson, Mass.:

"The quarry embraces an area of five or six acres, upon the gentle slope of a moderate sized hill. The rock is gneiss, without any apparent planes of stratification but of schistose structure. Divisional planes cut across the stratification and divide the rock into beds, which vary in thickness from one and a half inch to five feet or more. These beds are extensive, and are not broken by any other divisional planes. They conform to the surface of the hill, being in some places horizontal, and at others dip about 10 degrees. When a strata of any considerable length is quarried it is found to expand in the direction of the strike, northerly and southerly. The expansion was found to be one and a half inches in 354 feet long.

"Another result of the rock expansion was the formation of cracks and fissures attended at times by violent explosions. In 1872 there was a natural explosion which made a fracture extending two hundred and seventy-two feet and which was about seventy-five feet back of the working face. One end of the loosened mass remained solidly attached to the underlying rock, and by its expansion about 10,000 tons of rock were moved. These cracks at times took place slowly but at other times there was a sort of an explosion, by which the rock was shattered and broken and often stones were thrown considerable distances.

"In 1873 the engineer was startled by a noise as of an explosion and looking toward the quarry saw debris and dust in the air. He visited the place two days after and it looked as though an earthquake had taken place. A bed five feet four inches thick had been broken in two parallel openings each of which measured sixty-eight feet in length. Besides these fractures much of the rock was broken and shattered and some fragments were thrown south but none in any other direction."

THE OLDER ARCHITECTURE.

THE history of architecture is simple enough. One does not need statistics or special information to write the beginning of architecture. Its first thought originated in the idea of protection, the desire to get in out of the rain. Its origin was before the time of man. There can be on doubt that an animal of any kind enjoys the comfort that comes from being in a place of safety from the storms that are without. A dog in a house will look up with a feeling of security when there is rain and snow on the outside. A man sits a little closer in his chair, he is better satisfied, he stirs the fire with more satisfaction when there is a blustering, cold wind on the outside. There is satisfaction in the protection which a home affords, when everything is disagreeable out of doors. From these thoughts may be evolved the earliest history of architecture. The thought of protection is at the foundation of it all. No doubt the first human animal had his origin in a very temperate climate; all that he needed was a hole in the ground or a cave scraped out of a side of a hill. Finally it is possible that he added a little projection on the outside, it was a porch made with the small trunk of a tree, and a rude covering above. After this it is possible that a building was constructed which was composed entirely of these primary arrangements, a forked limb, a horizontal support, intermediate, slender fillings and then a roof. All of this was crude. The side walls were temporary indeed, a few branches, finally a plastering of mud. This was an improvement on the old way. It was educational, and like other modern conveniences, like other conditions which are brought about by educational influences, it led the primitive man to look ahead, to look for something still better. Possibly he cut a room out of a cliff and then he built his frame structure in front. The temporary qualities of the latter and the enduring features of the former in time led him to look for something which was more permanent. It came by degrees, and after a time it had its more complete development. The stone building was not different in its general construction from the previous wooden structure. There were no arches as in the present time. There were the stone supports, a form of which suggested itself in a natural way, one stone laid above another, an upright in one or more sections. First, a wooden lintel and afterwards one of stone, a roof of wood; the stone encroached a little more from time to time until a larger part of the building was made from the more enduring material.

The idea of ornamenting the structure came with the leisure and the satisfaction which belongs to having a permanent home of one's own. That quality is illustrated plainly enough to-day. A man builds a two or three room house, it is plain and simple, it is his own. He is busy; he has little time to do anything more than to make his family warm and comfortable. The home is paid for. He has more confidence in his position, he papers the walls with some regard to beauty, he decorates the grounds, he paints the building and selects the colors with care. He adds bric-a-brac to the internal features, buys pictures, locates a pretentious clock and shows the qualities in him which had their origin many years ago in the primitive man. Viollet Le Duc, the French architect and art critic, describes clearly enough the distinction between architecture as a mere handicraft and architecture in its approach to the artistic. He draws the picture of the savage who makes a crude inscription on the side of his doorway which illustrates the victory of the head of the household over one of the animals of the forest—he has killed a lion and the drawing is intended to illustrate the valor and courage of the head of that household. A strong man has killed a lion. Here is the illustration of that great event. It is the house which protects the man from the storm and here is the bit of decoration which illustrates the valor of that man. The house in itself is thoroughly utilitarian. The record of that man's courage is art, it conveys an impression, there is the record of a thought. In this we have illustrated the difference between something which is merely an item of utility and a fine art. In this suggestion we have the history of architecture. There is first the desire for protection, after protection is afforded there comes the leisure and the thought of higher things and then the decorative and art feature is added. The rendering is crude and commonplace but it represents an idea; it is artistic for that reason, and in this we have architecture.

Domestic architecture, home building, houses, had little place in the earlier architecture after the first. We know little or nothing about the earlier domestic architecture excepting what we surmise. The most that comes to us is of a primitive character. Interest centered in the public buildings, the churches etc. Religion and the government are so closely allied that it is difficult to separate the religious from other public structures. The stone architecture of the middle ages and the time which immediately followed is most conspicuous in ecclesiastical structures. During the middle ages nothing was thought to be worth living for that did not have direct connection with a church. This thought left an imprint upon the architecture of the world which time can never efface. The older cathedrals belonged clearly enough to this period.

We build churches today but in style, in beauty, in utility they do not compare favorably with the work of times past. Why so? The older architecture represented a thought. It was developed through the zeal of the Catholic religion. There must be a beautiful structure, one that was inspiring, one which conveyed the impression, as a man walked into the building, "How great is all that surrounds me and how little am I." First there was the structure itself, imposing and majestic, spires which pierced the clouds, beautiful decorations. The entrance was rich and gorgeous The interior, beautiful, large and impressive. We have weak imitations of these cathedrals in our church architecture to-day. No place in America, we may say almost in the world, is free from the influence of the medieval architecture. The influence is good enough, the result is generally bad, bad in comparison. The spirit and intelligence of the earlier architect is not there. Our Protestant churches, in copying the general style of architecture, do something which does not indicate great intelligence. The early cathedral in its impressiveness growing out of its beauty and size was part with the methods of the Catholic church. The building was important as contributing in interest and impressiveness to the religion. The form of the early cathedral is not suited to hearing and seeing on the inside, acoustics are entirely disregarded, and it is desired particularly that the interior of the building itself should be one great feature as contributing awe and interest to the worship. The building of these cathedrals and their maintenance was a part of the religion; they were not built for the purpose of hearing and seeing what was going on. Therefore the forms of these cathedrals is not suited to the requirements of the religion which is largely dependent upon what the people hear and see within the structure and where what is said is the all-important feature. We have cathedral forms as applied to the inexpensive chapels and churches in all parts of the country and in these structures we often find such forms antagonizing the conditions of comfort. In this city as in all others we have such buildings with tall spires. They are ugly, meaningless and temporary as here used. While it is true that no modern cathedral can in any sense compete in beauty and equipment with those of the older times how is it to be expected that a Protestant church can adopt the cathedral form and develope really successful architecture? It is one of the great incongruities of the times.

ROCK HISTORY—NO. I.

THE rocks which form the crust of the earth have been divided by geologists into different systems, according to their character and the fossils they contain. We can only know of the history of the earth by this record, written in the rocks by the animal and vegetable life, and preserved as fossils. Previous to even the dimmest and most imperfect record, there must have been an indefinite time which left no record. We can only know with any degree of certainty of that part of the earth's history which was recorded by the life upon the surface. Before this we can only approach it by means of more or less probable scientific reasoning. To such reasoning belongs the nebular hypothesis. According to this theory, our earth was first a mass of vapor which occupied many times its present space. As it revolved it cooled and contracted, until it became a smaller molten mass which was revolving as it does now, on its own axis and as well around the central sun. As this mass cooled farther, there was formed upon it a crust under which was still the molten material. This crust was the first rock, the foundation upon which all subsequent rock was deposited. Over the earth hung heavy clouds which, when finally precipitated, formed the water of the earth. As the earth cooled, this water fell upon the heated surface, only to be thrown back into the clouds as steam. A further cooling allowed it to remain upon the earth, a boiling ocean over its entire face.

All later rock has been deposited upon this first formed unstratified rock. Some part of the later deposit was no doubt precipitated from the muddy, cloudy waters. Again, the crust was very thin, the interior was a seething, molten mass which, as it cooled, contracted, necessitating great folds and breaks in the surface rock. Through breaks and fissures the melted center poured itself upon the surface under the water. The action of the water sorted and stratified this material, and it, together with the matter precipitated from the water itself, was in time formed into a stratified rock upon the surface of the original crust.

At the end of this period a small portion of the rock was by some internal force raised above the surface of the water, and the beginning of the continents was accomplished. In North America this rock is exposed in a V-shaped area in Canada and Labrador, which incloses Hudson's Bay in its arms. The western arm extends northward to an unknown distance, but probably to the Arctic ocean. There are islands of this rock at intervals extending as far south as Virginia, and it is found in places in Minnesota, Arkansas, and other states. Our granite is a type of this rock, which belongs to the Archæan era.

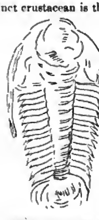
For many years geologists believed universally that this Archæn, or primary, rock was the original rock, the first formed crust; that it was utterly unstratified, but later investigations have gone to prove that the first rock is still unknown, that it underlies the Archæn rock to unknown thicknesses, and that our so-called primary rocks are formed from the fragments of the earlier rocks, from the outpouring and stratification of the molten material, and from the precipitation of matter held in the original ocean, all of which was stratified, as are later deposits. That the stratification is not easily recognized may be due to several causes, which we have not time to discuss here.

Thus, at the end of the Archæn era we had in this country a comparatively small land surface, which formed an irregular "V" through a portion of Canada, and south of this were numerous islands. Around this land washed the still almost universal ocean. It was believed for many years that there was no life upon this Archæn continent, but there are many reasons for believing that at this time there existed forms of life which have left no positive record behind that we have been able to find at this time. The existence of iron ore in this rock points to a vegetable life. The presence of limestone to some form of animal life.

Around the Archæn land surface and under the ocean the work of making a continent still went on. The small Archæn continent was washed by heavy rains; the rock was broken into fragments by different forces; these fragments were washed into the ocean, which sorted the material, deposited it in layers so that at the end of untold time the Archæn rock which had not been lifted above the water was covered by a new rock, known to us as the Silurian. Part of this rock was raised above the surface, joining the Archæn rock, and at the end of Silurian times, the Archæn rock was bordered by a strip differing from it in many ways, and known to us as the Silurian.

Rocks of different eras are better known to us by their fossils than by the character of rock itself. Different eras are distinguished by the character of the life on the earth at the time when they were formed. During Silurian times only the simplest forms of either animal or vegetable life existed. Vegetables were represented by the simplest forms of sea weeds, which it is difficult to distinguish with any degree of certainty, because of their perishable nature and the difficulty with which their forms could be preserved. A piece of any plant becoming entangled in the fragments of rock and buried with them under the water, if it did not decay and lose its form altogether before the debris was formed into rock, would at least lose its form to a great extent, while a shell or an animal with a bony skeleton would preserve much of its form during the time of rock formation. It is for this reason that our knowledge of animal life upon the earth is more complete than of vegetable forms.

During Silurian times there was no vertebrate life, that is, no animal with a spinal backbone. All animals were of the invertebrate order. We find shell fishes, sponges, worms, etc., in many varieties. They differ so much from any species found now that they have been the subject of much discussion as to whether they were really the same type. It is sufficient to say here that over ten thousand species of animal life are known. Of these between one and two thousand are what is known as trilobites, which range in sizes from those which are nearly microscopic to those two feet across. This extinct crustacean is the characteristic animal of the Silurian times. We present here a cut of these specimens.



AMERICAN TRILOBITE.

"If anybody was ever more pressed for time than I am I'd like to see him."

"There's such a fellow on exhibition at the museum."

"Who is he ?"

"An Egyptian mummy."—*Life.*

OUR ILLUSTRATION.

THIS month we present the design of Mr. H. Wolters, architect, of Louisville, Ky., for the Indiana Monument. It will be noticed that it is of the memorial hall order, a type of design which was chosen by many of the competitors in the competition. There are reasons to believe that such a design could have been successfully handled for this monument. However, it will be apparent to any one who has examined the designs, that in no case was a problem successfully handled in this way. The design of Mr. Wolters, in its outline, comes as near solving the problem by using the memorial hall idea, as any that were presented. The difficulties in the way of handling the memorial hall scheme have to do with the general location, the size of the plat, its surrounding, and the views which may be had of it. It may be known that the monument is to be constructed in the center of a circle, which is 330 feet in diameter, and that surrounding the circle are business blocks. There are approaches to this park from four different directions. It is placed at the intersection of two streets. If the park were larger, or if more extended views could be had of it, the problem would be much more simple. The design submittted by Mr. Schmitz took into consideration the limitations which exist in this problem. The tall shaft with the accessories extending from it, in size less than the width of the street, present distinct architectural features from various points of view. Now, if we take the memorial hall or a design for a monument which occupies a part of the Circle, it is apparent that no view could be had of it which would do the work justice. In the case of Mr. Wolter's design, it is apparent to anyone familiar with the surroundings, that the view he has given us could not be obtained. While this is true, it is the one suggested and called for by the conditions of the competition. The only satisfactory view would have been of the various pavilions of the different parts, from the middle of the streets at some distance from the park. This design conforms to the general situation, in so far as that is possible. There are projections in the direction of the principal streets which are emphasized. The corners, while conspicuous, are not emphasized to a degree which would overrate their importance. As to the details of this design, we said that in its outline, it came as near solving the problem by using the memorial hall idea as any that were presented. While this is true in outline, it is not true in detail. The details are crude, though not unstudied. The drawing is weak.

There is a great deal to be learned through this competition primarily, it has indicated the weakness of American architects in the matter of monumental designs. Again, it has made known their deficiencies in the knowledge of classic architecture. Where such forms have been adopted, this weakness has been apparent, not altogether in the forms themselves, but in the details. The greatest freedom is possible where classic forms are used, but it is required that the designer should have an abundance of resource at his back in handling something that is more than ordinary. In the outline which has been adopted by Mr. Wolters, it would require an extraordinary amount of knowledge of classic detail in order to successfully bring out his design. It may be said that a sketch of this kind is necessarily hasty and cannot expect to exhibit the full qualities of the design; however, there are some things which any sketch will show.

Asbestos has been aptly described as a physical paradox. It has been called "a mineralogical vegetable; it is both fibrous and crystalline, elastic yet brittle; a floating stone, which can be as readily corded, spun, and woven into tissue as cotton or the finest silk."

A NEW BUILDERS' CONTRACT.

BUILDERS have, in times past, been embarrassed through the necessity of signing contracts prepared for their signature by the party with whom the contract was made. The ordinary form of contract is prepared for or by the architect, and from his position and association with the interest of the parties by whom he is employed, without thought or intention, he becomes somewhat arbitrary. In that sense he is more or less antagonistic, unconsciously, to the interests of the builder. While this is less so at this time than in years past, it is well known that builders are sufferers from this state of things. In recognition of the justice which belongs to all, the American Institute of Architects, the Western Association of Architects and the National Association of Builders appointed special committees representing the several associations, who formed a joint committee for the purpose of formulating a form of contract which would meet the approval of all alike. It is now right and proper that builders as well as owners should demand, as a proper basis of agreement, this form of contract. It is a fair business document, and expresses the right that belongs to both parties, and which is incident to a building agreement. Recognizing this document as being one which is of particular interest to builders, and those who have intimate business relations with them, such as stone dealers and producers, we herewith give it in full as presented to us by the secretary of the National Association of Builders. Any contract for building material may properly be surrounded and protected by this form of agreement, and it is justice to all that this form be demanded, not only by members of the association but by other builders. It is representative of justice in these matters, and for this reason can wrong no one:

....Architect.

THIS AGREEMENT, made the..day of ....in the year one thousand..................hundred and.............................. by and between..
....
....
....
....part of the first part,
(hereinafter designated the Contractor ;) and..
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....
....part of the second part
(hereinafter designated the Owner ;)

Witnesseth that the Contractor , being the part of the first part, in consideration of the covenants and agreements herein contained on the part of the Owner , being the said part of the second part, do covenant, promise and agree with the said owner , in manner following, that is to say:

1st. The Contractor shall and will well and sufficiently perform and finish, under the direction, and to the satisfaction of..Architect (acting as Agent of said Owner), all the work included in the..
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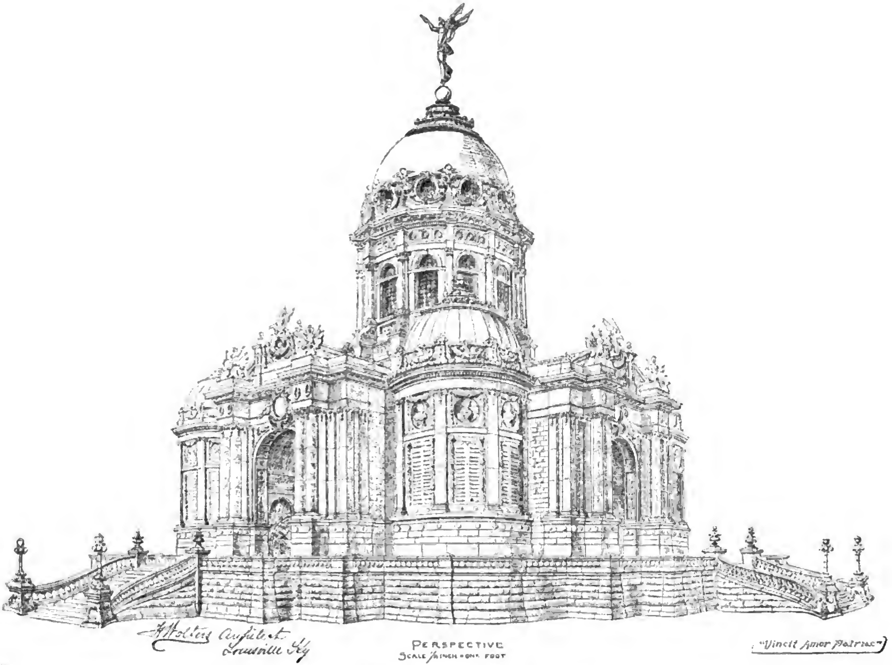
agreeably to the drawings and specifications made by the said Architect , and signed by the parties hereto, (copies of which have been delivered to the Contractor), and to the dimensions and explanations thereon, therein and herein contained, according to the true intent and meaning of said drawings and specifications, and of these presents, including all labor and materials incident thereto, and shall provide all scaffolding, implements and cartage necessary for the due performance of the said work.

2d. Should it appear that the work hereby intended to be done, or any of the matters relative thereto, are not sufficiently detailed or explained on the said drawing, or in the said specifications, the Contractor shall apply to the Architect for such further drawings or explanations as may be necessary, and shall conform to the same as part of this contract, so far as they may be consistent with the original drawings, and in event of any doubt or question arising respecting the true meaning of the drawings or specifications, reference shall be made to the Architect , whose decision thereon, being just and impartial, shall be final and conclusive. It is mutually understood and agreed that all drawings, plans and specifications are and remain the property of the Architect .

3d. Should any alterations be required in the work shown or described by the drawings or specifications, a fair and reasonable valuation of the work added or omitted, shall be



DESIGN FOR INDIANA STATE SOLDIERS' AND SAILORS' MONUMENT
By H. Wolters, Louisville, Ky.

made by the Architect , and the sum herein agreed to be paid for the work according to the original specification, shall be increased or diminished, as the case may be. In case such valuation is not agreed to, the Contractor shall proceed with the alteration, upon the written order of the Architect , and the valuation of the work added or omitted shall be referred to (3) three Arbitrators, (no one of whom shall have been personally connected with the work to which these presents refer), to be appointed as follows: one by each of the parties to this contract, and the third by the two thus chosen; the decision of any two of whom shall be final and binding, and each of the parties hereto shall pay one-half of the expense of such reference

4th. The Contractor shall, within twenty-four hours after receiving written notice from the Architect, to that effect, proceed to remove from the grounds or building, all materials condemned by , whether worked or unworked, or take down all portions of the work which the Architect may condemn as unsound or improper, or as in any way failing to conform to drawings and specifications, and to the conditions of this contract. The Contractor shall cover, protect and exercise due diligence to secure the work from injury, and all damage happening to the same by neglect, shall be made good by

5th. The Contractor shall permit the Architect , and all persons appointed by the Architect , to visit and inspect the said work or any part thereof, at all times and places during the progress of the same, and shall provide sufficient, safe and proper facilities for such inspection.

6th. The Contractor shall and will proceed with the said work, and every part and detail thereof, in a prompt and diligent manner, and shall and will wholly finish the said work according to the said drawings and specifications, and this contract, on or before the........................day of..............................in the year one thousand........................ hundred and.............................. (provided that possession of the premises be given the Contractor , and lines and levels of the building furnished him on or before the........................day of..............................in the year one thousand........................ hundred and..............................), and in default thereof the Contractor shall pay to the Owner..............................dollars for every day thereafter that said work shall remain unfinished, as and for liquidated damages.

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7th. Should the Contractor be obstructed or delayed in the prosecution or completion of the work by the neglect, delay or default of any other contractor; or by any alteration which may be required in the said work; or by any damage which may happen thereto by fire, or by the annual action of the elements, or otherwise; or by the abandonment of the work by the employes through no fault of the Contractor , then there shall be an allowance of additional time beyond the date set for the completion of the said work; but no such allowance shall be made unless a claim is presented in writing at the time of such obstruction or delay. The Architect shall award and certify the amount of additional time to be allowed; in which case the Contractor shall be released from the payment of the stipulated damages for the additional time so certified and no more. The Contractor may appeal from such award to arbitrators constituted as provided in Article 3d of this contract.

8th. The Contractor shall not let, assign or transfer this contract or any interest therein, without the written consent of the Architect .

9th. The Contractor shall make no claim for additional work unless the same shall be done in pursuance of an order from the Architect , and notice of all claims shall be made to the Architect in writing within ten days of the beginning of such work.

10th The Owner agree to provide all labor and materials not included in this contract in such manner as not to delay the material progress of the work, and, in the event of failure so to do thereby causing loss to the Contractor , agree that will reimburse the Contractor for such loss; and the Contractor agree that if shall delay the material progress of the work so as to cause any damage for which the Owner shall become liable (as above stated), then shall make good to the Owner any such damage—over and above any damage for general delay herein otherwise provided; the amount of such loss or damage, in either case, to be fixed and determined by the Architect , or by arbitration, as provided in Article 3d.

11th. The Owner shall effect insurance on said..............................work, in his own name, and in the name of the Contractor , against loss or damage by fire, in such sums as may from time to time be agreed upon with the Contractor , the policies being made to cover work incorporated in the building, and materials for the same in or about the premises, and made payable to the parties hereto, as their interest may appear.

12th Should the Contractor at any time refuse or neglect to supply a sufficiency of properly skilled workmen, or of materials of the proper quality, or fail in any respect to prosecute the work with promptness and diligence, or fail in the performance of any of the agreements on part herein contained, such refusal, neglect or failure being certified by Architect , the Owner shall be at liberty, after three days written notice to the Contractor , to provide any such labor or materials, and to deduct the cost thereof from any money then due or thereafter to become due to the Contractor under this contract; and if the Architect shall certify that such refusal, neglect or failure is sufficient ground for such action, the Owner shall also be at liberty to terminate the employment of the Contractor for the said work and to enter upon the premises and take possession of all materials thereon, and to employ any other person or persons to finish the work, and to provide the materials thereof; and in case of such discontinuance of the employment of the Contractor he shall not be entitled to receive any further payments under this contract until the said work shall be wholly finished, at which time, if the unpaid balance of the amount to be paid under this contract shall exceed the expense incurred by the Owner in finishing the work, such excess shall be paid by the Owner to the Contractor , but if such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner . The expense incurred by the Owner as herein provided, either for furnished materials or for finishing the work and any damage incurred through such default, shall be audited and certified by the Architect , whose certificate thereof shall be conclusive upon the parties.

13th. And it is hereby mutually agreed between the parties hereto, that the sum to be paid by the Owner to the Contractor for said work and materials shall be........................

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subject to additions or deductions on account of alterations as hereinbefore provided, and that such sum shall be paid in current funds by the Owner to the Contractor in installments, as follows:

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It being understood that the final payment shall be made within..................days after this contract is completely finished, provided, that in each of the said cases the Architect shall certify in writing that all the work upon the performance of which the payment is to become due has been done to satisfaction; and provided further, that before each payment, if required, the Contractor shall give the Architect good and sufficient evidence that the premises are free from all liens and claims chargeable to the said Contractor ; and further, that if at any time there shall be any lien and claim for which, if established, the Owner or the said premises might be made liable, and which would be chargeable to the said Contractor , the Owner shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify against such lien or claim, until the same shall be effectually satisfied, discharged or cancelled. And should there prove to be any such claim after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging any lien on said premises, made obligatory in consequence of the former's default

14th. It is further mutually agreed between the parties hereto, that no certificate given or payment made under this contract, except the final certificate or final payment, shall be conclusive evidence of the performance of this contract, either wholly or in part, against any claim of the Owner , and no payment shall be construed to be an acceptance of any defective work.

15th. And the said Owner hereby promise and agree with the said Contractor to employ, and hereby employ to provide the materials and to do the said work according to the terms and conditions herein contained and referred to, for the price aforesaid, and hereby contract to pay the same, at the time, in the manner, and upon the conditions above set forth.

16th. And the said parties for themselves, their heirs, executors, administrators and assigns, do hereby agree to the full performance of the covenants herein contained.

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In Witness Whereof, the parties to these presents have hereunto set their hands and seals, the day and year first above written.

In presence of

POPULARITY OF MARBLE.

A noticeable feature in the construction of modern residences and business buildings is the growing popularity of the use of marble. There is undoubtedly no other building material at present known capable of such rich natural finish, and giving so decided an impression of elegance and tone to an otherwise unattractive building as the beautiful stone which our country produces cheaply and in such inexhaustible quantities.

In Chicago, many of the old buildings erected immediately after the fire have been modernized by the generous use of marble, and are now more attractive and in greater demand than some of the more recently built structures in which interior finish was confined to wood, or other cheaper and less beautiful materials.

In this city, a generous use of marble is evident in the Singer building, the Fourth National bank, the Odd Fellows' hall, and other fine structures erected during the past three years. Particularly has marble supplanted other finishing materials in hall-ways and entrances to public and private structures, wainscoting, mantles, and other forms of interior use in this city and elsewhere. The coming era from all appearances will be the age of marble.—*Building Trades Journal.*

Higgins (meeting his friend Wiggins in restaurant)—"By Jove, Tom! I should think you'd be afraid to eat that dish. It's fatal!"

Wiggins—"What's the matter? It's only spare ribs and apple sauce."

Higgins—"Well, isn't that just what knocked out Adam!"
—*Judge.*

The manufacture of counterfeit implements of the stone age seems to be becoming quite an industry. A recent deception, detected at the Smithsonian Institution, consisted in chipping away parts of genuine spears or arrow-heads, and selling the mutilated flints at a greatly increased price as rare and curious forms.

MARBLE AND THE TARIFF.

The marble industry in this country is very important and diversified. There are great quarries in different sections of the country, and there is scarcely a city, village or hamlet in the Union that does not have at least one marble yard or shop. The American marble-worker could not live if he had to compete on even terms with the Italian workman, whose wages, as has been shown by testimony before the New York Immigration Investigation Committee, range from 20 to 50 cents per day. Under the present tariff the duty on marble in the rough or block is 65 cents per cubic foot and on manufactured marble 50 per cent ad valorem. The Mills bill, as reported, put block marble on the free list and reduced the duty on manufactures of marble to 30 per cent. Mr. Mills consented to modify the marble schedule, but as shown in the bill the reduced duty would injuriously affect every marble-worker in the country. A recent business transaction in this city shows that the American workman gets the benefit of every cent of the protective duty and that if it is removed or lessened he will be the one to suffer. Mr. Otto Schemansky, at No. 827 Gratiot avenue, deals in monuments and marble work, having, under the beneficent advantages of the protective system, risen within a few years from a common workman to the proprietorship of a prosperous business. He recently ordered from Italy, through W. C. Townsend, a marble broker and agent, a monument of what is called a draped urn pattern exactly the same in design and finish as is made by several American manufacturers. The contract price paid by Mr. Schemansky was $105, the monument being shipped to him direct, he paying the duty and freight to New York, which together amounted to $48, and remitting the balance, $57, to Mr. Townsend, as shown by the bill exhibited to the *Tribune* yesterday. Mr. Townsend's regular agent's commission on sale was 20 per cent, or $21, and the cost of the marble at the quarry in Italy $22.67 ($2 per foot on 11 feet 4 inches of stock). What is left for the Italian workman who manufactured the monument is shown as follows:

Price delivered in New York		$105 00
Duty and freight to New York	$48 00	
Agent's commission	21 00	
Cost of stock at quarry in Italy	22 67	
		91 67
Balance		$13 33

Out of this $13.33 balance the Italian manufacturer must pay his workman and get his profit.

The largest marble manufactory in this country is at Rutland, Vt., where monuments of this same pattern are made, and whence we obtain this statement of the amount actually paid for work on monuments of the same size and design, as follows:

12	days cutting on urn at	$2.25.	$27 00
2	days polishing on urn at	1.60.	3 20
10	days cutting on die at	2.25.	22 50
5	days polishing on die at	1.60.	8 00
1½	days cutting on base at	2.25	3 37
1½	days polishing on base at	1.60	2 40
			$66 47

In all there were 32 days' work on the monument, for which the American workman gets $66.47, or an average of $2.08 per day, while the Italian workman, with no allowance made for his employer's profit, gets $13.33, or less than 42 cents per day.

There are probably two or three thousand marble-workers in Michigan. Under free trade, either they would have no work to do or they would be obliged to compete with Italian labor at 42 cents a day.—*Detroit Tribune.*

When a ghost eats green apples the natural result would be cholera in phantom.—*Danville Breeze.*

RAISING PONDEROUS PILLARS.

Describing the process of putting in place the immense columns at St. Isaac's Cathedral, St. Petersburg, a writer in the *Carpenter and Builder* says: The operation was extremely interesting, from the size of the pillar, and the height at which it was placed, it being the second tier or story of columns on which they were engaged. Its base must be 130 feet or 140 feet from the ground. Each pillar is a solid block of granite, 42 feet high, and weighing 5,000 poods, or upwards of eighty tons (larger than the pillars of the Pantheon, and both larger and better wrought than any pillar found in the ruins of Zenobia's capital). The columns on the ground tier, each of which is also a single stone, are 56 feet high, and weigh 11,000 poods each. When I reached the platform to which the pillar was to be raised, I had below me a panorama of St. Petersburg and the country around for many a mile, the most interesting part of the prospect being the Gulf of Finland down which I could see as far as Cronstadt. The day was warm and bright, and the air free from cloud and smoke. From the platform down to the next stage, a depth of about 80 feet was fixed a strong timber frame, covered with planks, so as to form a very steep inclined plane. At the bottom of the slide, when I first looked down, the column to be raised was lying horizontally on rollers; it was girthed round with very thick ropes drawn very tight, and padded underneath. Other ropes, or rather cables, secured to these girths, passed lengthways along the column, crossing each other over its lower end, and it was lashed to strong planks which lay under it, that the polish of the stone might not be injured in ascending the slide. Over the base on which the column was to stand was placed a high framework of strong timbers. The cables, twelve in number, attached to the pillar, passed through blocks fixed in the frame, and with the aid of one movable pulley to each, were drawn by twelve capstans, each manned by fourteen or sixteen men. There were two extra capstans for the purpose of guiding the lower end of the pillar when suspended in the air. Altogether, upwards of two hundred men were employed in the operation. When all was ready the capstans began to turn, and by degrees the column, instead of lying in a horizontal position, rested on the inclined plane, which was well greased, and began slowly to ascend, two men standing on its upper end, to be ready in case of the cables becoming entangled. The capstans were all numbered, and the superintendent at the top, by calling out sometimes to one gang, and sometimes to another, to move faster or slower, kept all the ropes drawing equally. The column at length reached the top of the inclined plane, and it was then raised until it was hanging in the high wooden frame exactly over the base on which it was to stand. A coin was dropped into a small hole in the center of the base, which was then covered with a sheet of lead, and, the tackling round the lower end of the pillar being cut and cleared away, it was lowered gently into its place. The whole operation which was now complete, occupied about two hours from the time the capstans began to work until the pillar rested upon its base.

AMERICAN PORTLAND CEMENT.

As compared with the imported Portland cement, the American Portland may be said to be far superior to a large number of imported brands; but it is also true that a considerable number of the imported articles are in turn superior to the American.

The works at South Bend, Indiana, manufacturing Portland cement, have been obliged to add to their facilities in order to supply the increased demand for their product, which seems to have steadily maintained its good standard of quality.

A considerable variation existing at present in the modes of testing cements is unfortunate, and makes it very difficult to arrive at a correct conclusion in all cases as to the comparative merits of different articles.

The following description of the process of manufacture used by the American Improved Cement Company at their works at Egypt, Pennsylvania, is taken from a paper by Mr. R. W. Lesley, and read before the Engineers' Club, at Philadelphia:

"The material used in the manufacture is a hydraulic limestone or cement rock containing the proper chemical ingredients. The process is briefly as follows: The raw rock is crushed and ground dry. The powder thus formed is run into a mixer, when a small proportion of pitch and water is added. The moistened powder is then passed through a heavy pair of rolls, having matched egg-shaped cavities, which mold it into small eggs and deliver these latter in front of the kilns, avoiding all handling. These eggs can be used the same day in the kilns if necessary, whereas under the old process the same stage of manufacture required weeks, a manifest advantage, to say nothing of the immense saving in labor, land, and interest. The form of the material, its uniformity in density, porosity, and size make it more easily burned, handled, crushed, and ground, and make it a saving at every stage of the process; while the addition of pitch aids the uniform burning, and moreover, by forming pores, through which the moisture in the eggs escapes, prevents them from falling away in the kiln, which they would otherwise do, owing to the generation of steam within them and the formation of a crust on their outer surfaces. This is the point which in the old processes prevented placing the wet paste in the kilns promptly, and which here overcome by the use of a combustible. By this process the foreign brands are fairly met in point of price, and repeated tests by leading authorities here and in Europe show that the quality of the cement made is equal to the foreign Portland."

THE GREAT WALL OF CHINA.

For a short distance either side of the Le-wan pass the wall is constructed of brick, with rubble in the centre; but further away it is composed almost wholly of stone; in fact, whatever materials were closest at hand would appear to have been made use of. Thus, at the spots we visited, granite abounded in greatest profusion, so in the construction of the wall was it made the principal ingredient, and for miles the wall consists of large shapeless masses of granite smoothed on the outside. We observed but one tower built entirely of stone, they being, with this exception, composed of brick with foundation of hewn stone. The height of the wall from the top of the parapet measures about 17 ft. 10 in. at most parts, though occasionally, where the parapet is highest, its measurement is 18 ft. 6 in.; its breadth is 13 ft., and the height of the parapet 5 ft. 4 in. The towers are 31 ft. 3 in. high, and 28 ft. 1 in. broad. The parapet is both crenelated and loopholed, and the towers are pierced for the discharge of some projectile. From any elevated site the scenery well repays one for the trouble of ascent; clear streams are seen meandering down the passes, while on every side and looming far in the distance are a succession of brown hilltops, with small patches only under cultivation. Droves of pack-asses are seen going and returning, the former unladen, and the latter bringing a small kind of brushwood, which the borderers burn instead of the millet-stalk in use on the plains, while in wild abundance are scattered innumerable ash, poplar, and fir trees. Offshoots branch out from the wall in occasional places. For their construction it is difficult in every case to assign a reason. The town Le-wan Eu is completely encircled by one, and on the opposite a double wall winds upward with the portions in nearly parallel lines.

A visit the following day to the pass of Chapow, distant about twenty-one lee from that of Le-wan, confirmed our surmise that, in the erection of the wall, the contractors, if such there were, availed themselves to any extent of the building materials closest at hand. We noticed several guns, most of which were partially embedded in the earth rubble forming the centre of the wall; one bore an inscription recording that it was cast in the reign of Wan Lee, the last emperor of the Ming dynasty. It must, therefore, have been upwards of 260 years old, and was evidently fashioned after a European model. A great many of the towers were in a decayed state, and the interior of some of them, having been cleared of debris, were converted into gardens and granaries. The Chinese speak of the wonderful structure as the "10,000 lee old wall," and appear to consider it extremely natural that strangers should desire to visit it. The sight amply repays one for the trouble and difficulties of the journey; and when the fact is realized, that for thousands of miles this extraordinary product of the masonic art pursues its serpentine course, all other so-called wonders of the world fade by comparison with this lasting memento of a despot's folly, and the involuntary labor of a submissive people. —*Architect.*

A BUILDING ACCIDENT.

Experience, however great, does not appear to avail all that might be expected of it. The account of the collapse of a new church building in Washington a few days ago comes as a surprise, particularly so when we consider the reputation and experience of the architect in charge, Mr. J. Cleveland Cady. The falling of a structure of this kind is unusual, its destruction in the hands of one so well known is startling indeed. It appears that the builder had warned those in charge of the impending danger. The architect and the public building inspector, after an inspection of the work, pronounced everything all right. The destruction of the building came as the strong emphasis of the judgment of the builder. The trouble, it would appear, was caused by the failure of one of the main supporting columns of the tower which the architect said was sufficient to carry ten times the weight that came upon it. It is surmised that the settling and ultimate collapse were caused by the presence of quicksand under the footings. Future investigations will, no doubt, settle this matter. An architect unfamiliar with local conditions labors under certain disadvantages which should lead him to be exceedingly careful to take great precautions in the conduct of work outside of his usual channel. He may have great experience in one particular locality and be very inexperienced to the conditions which belong to another. For instance, an architect of a building in a city like Cincinnati, St. Louis or Kansas City would find conditions very foreign to his practice in Chicago or the back bay district of Boston. Years and gray hair, a large practice and the ordinary formulas would avail very little.

THE BIGGEST TOMBSTONE.

Henry Scarlett was buried August 9th under a rock about 100 x200 feet in dimensions. Scarlett lived in the upper part of Upson county, where he had amassed a great deal of money and owned large tracts of land. In early life he had been disappointed in a love affair, and ever afterward lived as a hermit. Several years ago, in anticipation of coming death, he selected the huge bowlder referred to as his tombstone. He sent to Atlanta for a stonecutter and had a suitable inscription placed upon the rock, and then a cave was dug down under it, where a coffin was placed to await the corpse. Recently Scarlett fell ill and died. He was buried according to his desire, under the biggest tombstone on record, and the cave was closed in.—*Atlanta Corr. New Orleans Times-Democrat.*

BOOK AND PERIODICAL REVIEW.

No. 23 of *Collier's Once a Week* published 29th of September, is a literary and artistic marvel. Never have so many living authors of highest celebrity been gathered together in one number of one journal, while the magnificent illustrations are on a par with the fascinating literature. Amélie Rives (Chanler) contributes a weird, thrilling and enchaining poem, entitled Asmodéus. Dion Boucicault commences an Irish-American serial that is bound to cause a tremendous sensation. The list of contents speaks for itself.

Amélie Rives, Poem "Asmodéus." Illustrated by Sterner.

Marion Harland, Story "Dodder." Illustrated by Steeple Davis.

Julian Hawthorne, Story "Sally Kirk's Easy Chair." Illustrated by Hal Hurst.

Benson J. Lossing, "Pioneers of Painting in America." Portrait.

Bill Nye, Story "Crononhotonthologas." Illustrated by Zimmerman.

Dion Boucicault, Novel "Hy-Bras-Ayl; or the Nine Lives of Con O'Neil." Illustrated by McIlvain.

Ella Wheeler Wilcox, Poem "Couleur de Rose."

Edgar Fawcett, "The Pathos of Growing Fat."

R. K. Munkittrick, Novelette "Diary of a Giddy Girl." Illustrated by Coultaus.

James Whitcomb Riley, Poem "Down Around the River."

Joseph Howard, Jr., "Reminiscences."

Mary Kyle Dallas, "Woman's World."!

Maurice Thompson, Poem "America."

Patience Stapleton, Story "True to the Heart's Core." Illustrated by Peloze.

Charles Barnard, "How to Make a Man of a Boy."

Minnie Irving, Poem "Heliotrope."

Continuation of serials "A Masked Marriage," and "A Woman's Mistake."

This wondrous number can be had for seven cents, and we would urge our readers to apply to their newsdealers without delay. *Collier's Once a Week* has taken a lead that from all accounts it means to keep. Such enterprise is a credit to the country, and thoroughly American.

The second volume of "Alden's Manifold Cyclopedia," now on our table, even better than the first, fulfills the promises of the publisher's prospectus. It is a really handsome volume of 640 pages, half Morocco binding, large type, profusely illustrated, and yet sold for the price of 65 cents; cloth binding only 50 cents—postage 11 cents extra. Large discounts even from these prices are allowed to early subscribers. It is to be issued in about thirty volumes. The "Manifold Cyclopedia" is, in many ways, unlike any other cyclopedia. It undertakes to present a survey of the entire circle of knowledge, whether of words or of things, thus combining the characteristics of a cyclopedia and a dictionary, including in its vocabulary every word that has place in the English language. Its form of publication is as unique as its plan—the "Ideal Edition" its publisher calls it, and the popular verdict seems to sustain his claim. It certainly is delightfully convenient. It will not be strange if this proves to be the great popular cyclopedia. It certainly is worthy of examination by all searchers after knowledge. The publisher sends specimen pages free to any applicant. John B. Alden, publisher, 393 Pearl street, New York, or Lakeside Building, Chicago.

"THE FACE OF ROSENFEL," by Charles Howard Montague. No. 6 of the "Manhattan Series," of Popular American Novels. Paper, 12mo. Price, 25 cents. Published by A. L. Burt, 56 Beekman street, New York.

"The Face of Rosenfel" is the striking title of one of the most interesting of recent novels. The author is Charles Howard Montague, a writer of wide popularity and versatile genius. While in no sense a mere detective story, it has all the absorbing fascination of a search for the clew to a baffling mystery, and it is finally developed, not by the tricks of the searchers, but by the natural results of the crime which underlies it. There is more, however, in "The Face of Rosenfel" than mere absorbing narrative. Mr. Montague has created at least one very original character in his capital novel, and it bids fair to take a place in literature as a unique example of that puzzling class of men who go to ruin solely because they despise themselves. The reader will be captivated by the vigor and movement of the story, and it will undoubtedly be one of the most talked-of books of the year. It is for sale by The Bowen-Merrill Co., Indianapolis, Ind.

We have received catalogue No. 6, which fully illustrates and describes in detail the many styles of the Clayton air compressors, duplex and single, actuated by steam, belt or gearing, for working rock drills, hoisting engines and water pumps. In addition it gives much reliable information and data of interest to users of compressed air, and descriptive tables and price lists of rock drills, hoisting engines, mining and boiler-feed pumps, blasting batteries, fuse, exploders and complete mining and tunneling plants in general.

Copies of this catalogue, estimates and general information, will be mailed on application to the Clayton Air Compressor Works, 43 Dey street, New York.

Carlyle's "Heroes and Hero Worship," which has been adopted by the Indiana Teachers' Reading Circle, and is this celebrated author's most popular book, with the possible exception of "The History of the French Revolution," is published in neat, attractive form by John B. Alden, New York and Chicago, at the amazingly low price of 10 cents, post-paid, for paper cover, or 25 cents in handsome cloth binding, with 5 cents extra for postage. Even from these prices reduced rates are offered to members of the Reading Circle. Alden's catalogue which is sent free to any one is a curiosity in its wealth of high-class literature at nominal cost.

EASTERN INDIANA STONE.

THROUGH a large portion of Eastern Indiana there occur exposures of what is known as Niagara limestone. This stone, while it forms a lucrative and ever-increasing industry for that portion of the state, is, as yet, only in its infancy. Prof. Cox, formerly State Geologist, says that there are thousands of acres of this stone lying only just below the surface which are as yet untouched, only a few acres being worked at the present time. The stone lies in beds of an average thickness of forty feet of which twenty-five feet is clear quarry stone. The supply is inexhaustible. Where the stone is exposed and weathered the outcrop presents a rough perpendicular bed wall of "cliff rock," without any accumulation of fallen fragments at its base. One cannot but be impressed with the belief that this stone is practically indestructible, from the fact that untold ages have not been able to affect this surface rock.

In appearance the stone is light blue or light gray, drab and buff, or drab and gray in color. The best quarry stone is of a uniform drab or light blue. The drab stone on exposure to the weather turns to a buff and exposed sections of more than two inches in thickness, when broken across, show a drab center. The stone is in demand for all kinds of architectural purposes, from the foundation to the coping and for heavy masonry is unexcelled.

In chemical composition this stone is a magnesian limestone, in which the percentage of carbonate of lime exceeds the carbonate of magnesia. The stone is, when considered mineralogically, a dolomite, semi-crystalline in character. The stratification is heavy, the bedding in places heavy but as a rule thin to medium heavy. From the absence of seams of faults it can be quarried in length and width far beyond the possibilities of transportation. As it comes from the quarry the top and bed are ready for use.

This stone makes a strong "hot" quicklime. For certain uses such as purifying gas it is very valuable. Stone from the corniferous group outcrops in this same region, but for many years its appearance was against it and it was not put to any economic use, when it was finally tested it was found to make a beautiful white lime which is now meeting with much favor, it makes what is known as "lean" or "cool" lime, which runs smoothly under the trowel and does not chip or crack, when used in a mortar it partakes of the character of a hydraulic cement and in time becomes harder than brick.

A party of New York capitalists is negotiating with Thomas Lynch, Gardner Gates and Jewett P. Cain for the purchase of a valuable marble deposit recently bonded by them on the same vein as the Orvillo.—*Rutland Herald.*

MINNESOTA GRANITE.

PROF. N. H. WINCHELL, state geologist of Minnesota, in reporting on the building stones of that state, says with reference to redand gray granite which is now becoming well known, having beenused in numerous public and private buildings of that state, as well as others: "The East St. Cloud stone, now generally used, is of a gray color and uniform texture. The crystalline grains are rather fine, so that the texture is close. The color, however, is disturbed sometimes by the sudden appearance of greenish spots of the size of butternuts, or even as large as six inches in diameter, caused by the abundance of a greenish, rather soft mineral, which seems to imply that the whole rock was originally a conglomerate, containing rounded pebbles and stones of different composition, and that on metamorphic crystallization some of the pebbles refused to become wholly obliterated or absorbed into the homogeneous mass. In most of the rock, however, these spots are not seen.

"The fine-grained gray granite consists largely of quartz embraced in a matrix of orthoclase, with but a small proportion of mica or chlorite. The dark mica is biotite, and there is but occasionally a grain of hornblende. There is also occasionally a grain of a triclinic feldspar, and of magnetic and some minute crystals of pyrite. About one-third of the whole rock is made up of quartz and two-thirds of the remainder of orthoclase. About one-half of the rest is hornblende, and the residue is divided between the other minerals, chlorite predominating. The minerals, biotite, muscovite and chlorite, which make the crystalline rock easier to cut, are, in this rock, arranged sometimes with their cleavage surfaces prevailing in one direction or lie in belts, and much facilitating the operations of the quarry by giving the stone a "rift," so called, the beds being from eight inches to five feet thick.

"The composition of the red syenite is not very different from the foregoing, but the feldspar is mainly flesh red, and all the grains are coarser. It has also a higher per cent. of silica, a fact that has been discovered by its owners who have given up the general use of it because it is more costly to work. It is reported that this stone at places becomes coarser grained, and somewhat resembles the Scotch granite which is imported into the United States. In the winter of 1874-75 a block weighing ten tons was taken out of the red granite quarry for a monument base. It was polished at St. Cloud, and was delivered to its purchaser at Chicago. This was very fine, and closely resembled the Scotch granite, both in color, grain and polish. At the point where this was taken cut the granite rises about twenty feet above the general surface, and spreads over more than an ac ."

Prot. Winchell reports that the red and gray granites are found close together in such a way as to suggest that they were both originally gray, but that the red color has been brought about by some difference in the exposure to the elements. When freshly quarried they both appear glassy. The gray has a clear, bluish gray, uniform color, and is feebly translucent.

There is found in Nicollet, Cottonwood, Watonwan, Rock and Pipestone counties a red quartzite which is the hardest stone in the state, and probably the hardest in the United States that has been used for building purposes. It consists almost wholly of quartz (84-52 per cent.), the color being given it by iron oxide, which is disseminated among the grains among their cement. "This rock is very difficult to dress into dimension walls, but when once used, is indestructible."

Look over this issue carefully. If you are not a subscriber, don't you think you can get two dollars' worth of information from our columns in the course of a year?

PERMEABILITY OF PORTLAND CEMENT MORTARS.

A recent number of the *Annales des Ponts et Chaussees* contains an interesting article on the permeability of Portland cement mortars, by Messrs. L. Durande-Clay and P. Bebray. In conducting a series of experiments on samples of cement mortar taken from various marine works in England, France and Belgium, the authors observed that all these mortars were permeable.

A block of the material placed in an earthenware dish in such a way as to divide the dish into two compartments was rapidly penetrated by a six per cent. solution of magnesium sulphate poured into one of the compartments, leakage past the sides of the block being prevented by a water-tight joint of plaster. As the solution filtered through it was constantly removed by a syphon, and fresh solution poured into the first compartment.

At the end of sixteen days a fissure three or four centimetres long appeared in the block, and on the next day another crack was seen, the block swelling in the process. It was then determined to carry out a number of experiments with ordinary water, a solution of chloride of magnesium and one of sulphate of magnesium.

The arrangement finally adopted was to close one end of a glass tube about 1½ inches in diameter with plugs of the cement mortar, the other ends of the tube being closed with caoutchouc stoppers, through which passed glass tubes about forty inches in length connected with Marriotte flasks containing the different solutions.

The cement mortar used consisted in each instance of one part by weight of cement to four parts of sand, mixed with quantities of water varying in different cases from .07 up to .12 of the total weight of the mixture, and in all the experiments the rate of filtration was at first somewhat rapid, but diminished as time went on, becoming finally extremely slow.

The glass tubes invariably cracked after some days, owing to the swelling of the cement plug, thus putting an end to the experiments. Three series of experiments were made; in the first the mortar prepared with nine per cent. of water was the least permeable, that mixed with seven per cent. was extremely so, as was that prepared with eleven per cent.

In the second series the best results were obtained with eleven per cent. of water, and in the third series with ten per cent. The action of the chloride of magnesium, which was a six per cent. solution, was much less injurious than the solution of magnesium sulphate, which was of the same strength.

Chemical analysis showed that the cements, after being acted on by the latter reagent, contained from 75 to 80 per cent. of sulphuric acid, showing that in the double decomposition taking place between the calcium and magnesium salts, a portion of the calcium sulphate remained in the body of the mortar, and it is to this fact that the authors are disposed to attribute the dislocation of Portland cement masonry when exposed to the action of sea water, for whilst the magnesia produced is deposited in the state of a thin cream without consistence, the sulphate of chalk solidifies more or less completely in the crystalline form, and develops considerable internal stresses.

Algernon (waiting)—"Aw, I say, Bobby, what does you'ah sistah think of me, anyway?"

Bobby—"She says she thinks you're just too nice to live—and ——"

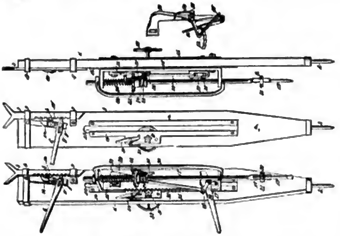
Algernon (highly elated)—"Yaas!"

Bobby—"An' she can't why see the authorities out of mercy don't have you shot."—*Judge.*

REGENT PATENTS.

ISSUE OF AUG. 28, 1888.

No. 388,711—Rock-Drilling Machine. John A. Pashley, Radersburg, Mont. Filed April 12, 1888.



CLAIM.—1. In a hand-drilling machine, the combination, with a drill frame vertically adjustable upon a supporting-post, of a spring-actuated drill-stock mounted in said frame, a clevis fulcrumed on the frame and connected to the drill stock, and a lever straddled by the clevis and having its fulcrum upon the pivotal point of the latter, substantially as described.

2. In a hand drilling-machine, the combination of a supporting-post, a drill-frame adjustable along the post, a spring-impelled drill-stock, a clevis pivoted to the drill-frame, a rod pivoted to the clevis and connected with the drill-stock, a hand-lever straddled by the clevis and fulcrumed upon the pivot of the latter, a ratchet-wheel on the drill-stock, a bracket-arm secured to the drill-frame and having an elastic arm arranged in the path of the ratchet-wheel, and an inclined spring-impelled trigger pivoted on said bracket-arm, substantially as described.

3. The combination, with the supporting-post having the drill-frame adjustable thereupon, of guides on the end portion of the post, a rack-bar sliding on the post in said guide and having a bifurcated outer end, a pivot or fulcrum on the post, a swinging and lengthwise-movable hand-lever provided with a longitudinal slot engaging the pivot, or fulcrum, and pawls on the post engaging the sliding rack-bar, substantially as described.

4. In a hand-drilling machine, the combination, with a supporting-post having a longitudinal slot, of a drill-frame having its supporting bolts adapted to slide in said slot, a pinion meshing with a rack on the drill-frame, a spring-actuated drill-stock, a lever fulcrumed on the drill frame, and a clevis straddling said lever and connected to the drill-stock by a connecting-rod, substantially as described.

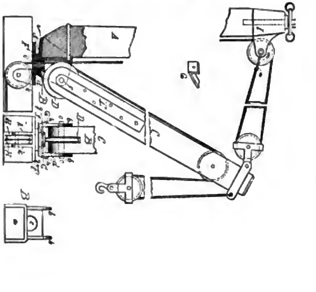
5. In a hand drilling-machine, the combination, with a supporting-post, of a longitudinally-adjustable drill-frame, a spring-actuated drill stock moving therein and having a ratchet, and a clevis pivotally mounted on said frame and connected to the drill-stock by a pivoted connecting-rod, a lever straddled by the clevis and having the pivot of the clevis, and elastic detent engaging with a ratchet, and a spring-actuated trigger pivotally mounted on the bracket arm carrying the detent, said trigger being inclined relatively to and lying in the path of the ratchet during part of its upward stroke, substantially as described.

No. 388,726—Artificial Stone Composition. Charles A. Shank, Philadelphia, Pa., assignor of one-half to John W. Shank, Central City, Nebr. Filed June 14, 1888.

CLAIM—A compound of rock-salt, muriatic acid, and sal-ammoniac, mixed with a body material and with coal-tar, substantially in the manner and proportion set forth.

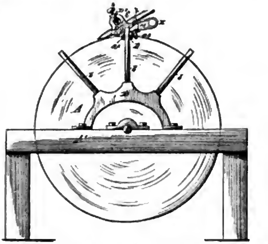
ISSUE OF SEPT. 4, 1888.

No. 388,839—Derrick. Oliver Crosby, St. Paul, Minn. Filed March 24, 1888.



CLAIM—The combination, with the foot B, having bearings adapted to support the mast and boom of a derrick, and having an aperture in the bottom thereof, of a trunnion extending through and fitting within said aperture and having a circumferential groove formed therein above the plane of said bottom, and gibs attached to said foot and entering said groove, substantially as and for the purpose herein specified.

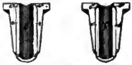
No. 388,958—Tool-Holder for Grindstones. James M. Dillon, Poughkeepsie, N. Y. Filed Feb. 17, 1888.



CLAIM—As a new article of manufacture, the tool-holder consisting of plates B B, having radiating arms b b, adapted to receive a holder consisting of a base, D, provided with spaced lugs d^2 d^2, for receiving a radiating arm, b, and a screw d^1, for fastening the same, and a holder, D', consisting of upper bars, e e, and lower bar e' e', united by end pieces, e^0, pivotally attached to base D, a spring, K, a catch M, and a sliding tool-clamp, all substantially as and for the purpose herein specified.

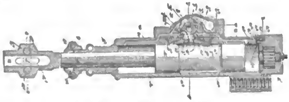
ISSUE OF SEPT. 18, 1888.

No. 389,467—Rock Drill. John Massett, North Tarrytown, N. Y. Filed Nov. 25, 1887.



CLAIM—In a rock drill, the combination, with the cylinder, piston, and piston-rod, of a cylinder-head composed of longitudinal sections provided with separable lock joint devices for separably uniting the sections, and a holder for sustaining the sectional head, and provided with means for detachably attaching the head to the cylinder, and motion-limiting devices for stopping the movement of the sections longitudinally of one another in locking them together at a predetermined point relatively to each other, together with a holder for sustaining the sectional head, and provided with means, substantially as described, for detachably attaching the head to the cylinder, as and for the purpose set forth.

No. 389,775—Steam Rock-Drill. Abraham J. Sypher, Iron Mountain, Mo. Filed Aug. 6, 1887.



CLAIM.—1. In a rock-drill, the combination of a cylinder having main steam-passages provided with branch passages and a rotary valve having a cove, or cavity, in the upper side, forming the steam-chest, alternately connecting with the branch passages and the exhaust-pipe, substantially as described.

2. In a rock-drill, an arm securely attached to the rotary valve, in combination with an arc tappet, an arc tappet-block fitting into and forming part of the cylinder and having an arc-shaped hole lengthwise of the block, into which the arc tappet is placed, and a piston with inverted inclines or shoulders, substantially as described.

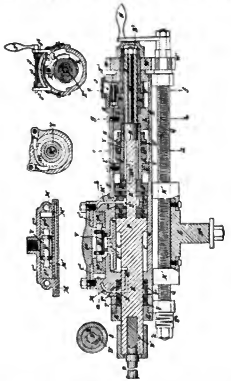
3. In a rock-drill, the combination of a valve having a tappet arm secured thereto, a cylinder having an arc-shaped passage, an arc-tappet valve driver having a slot for the tappet-arm on the valve, and a piston having inverted shoulders, substantially as described.

4. In a rock-drill, the combination of a valve, a cylinder having an arc-shaped passage, an arc-tappet valve-driver, an exhaust chamber or passage between the valve and cylinder, and a tappet arm secured to the valve and projecting through the exhaust passage in a slot or recess in the arc-tappet valve driver, substantially as described.

No. 389,740—Rock-Drill. Albert W. Daw and Zacharias W Daw, Aamdals Kobbervoerk, Skafse, ovre Thelemarken, Norway. Filed Aug. 13, 1887. Patented in England Aug. 1, 1887.

CLAIM.—1. The means for actuating the valve of rock-drills, consisting in arranging the valve between two pistons capable of reciprocating in suitable cylinders provided in the valve-chest, and from the outer end of each of which a passage leads through the stuffing-boxes or glands of the main cylinder into the latter, the passage from each valve piston cylinder passing through the stuffing-box at the opposite end of the main cylinder to that at which it is itself situated, the usual passages for the admission and exhaust of steam or air to and from the main cylinder being arranged between the ports or passages leading to the valve-piston cylinder, and two separate passages formed in the rod of the main or drill-piston, and each serving to control the supply and exhaust of the valve-piston cylinders, all substantially as specified.

Constructing the stuffing-boxes or glands of the cylinder of rock-drills with passages through them communicating with such cylinder, and also with one end of one of the two cylinders in which are arranged pistons carrying between them the valve for actuating the main piston of the drill, substantially as specified.



The arrangement of mechanism for feeding the drill forward as the work progresses, consisting in mounting on the piston-rod of the drill a hollow rifled rod provided with a longitudinal groove, with which a bolt projecting through the drill casing engages, so as to prevent its rotation on the piston-rod while allowing it to reciprocate therewith, such rifled rod engaging the boss of a crank mounted so as to be capable of a circular rocking movement thereon, and upon the arm of which is pivoted a pawl which engages a ratchet wheel, to the boss of which a toothed wheel is connected and gears with a pinion fixed to the feed-screw, working through a nut or nuts carried by the slide or saddle on which the whole machine is mounted, all substantially as specified.

TRADE-MARKS.

15,811—Gunpowder, Ammunition and Explosives. Charles W. Curtis, London, England. Application filed July 11, 1888. Used since 1860.

"The word 'Diamond.'"

15,813—Portland Cement. John C. Gostling & Company (Limited), London, England, and New York, N. Y. Application filed Nov. 29, 1887. Used since Aug. 13, 1875.

"The words 'Portland Cement' and the representation of the globe with an equatorial band or belt.

15,815—Mineral Cement. Kaw Valley Cement Co., Kansas City, Mo. Application filed June 26, 1888. Used since June 13, 1888.

"A diamond or lozenge-shaped figure inclosing the letter 'F.'"

WYOMING STONE.

The following is an enthusiastic account of the Platte Valley stone by *The Lyre*, of Saratoga, W. T. It is one of the many illustrations of the wonderful stone resources of this country, which are as yet almost untouched: "There is probably no section enshrouded by eastern fog or shone on by western sun in which nature has deposited more exhaustless or excellent building materials than the Valley of the Platte.

"It is all here—sandstone of variety of beauty, ease of access, limitless quantity, and quality unsurpassed; granite of formation wide and deep and unchallenged excellence; timber of hundreds of miles in area and growth mature and magnificent, and beds of building clay of unexplored depth.

"He that builds can build as he wills; he can fashion a mansion in the Platte Valley with the same ease and the nominal expense attending the building of a cabin in other less favored localities. Leaving the timber growth and the brick promise for future elaboration *The Lyre* will deal, in this article, solely with the Platte Valley building stone deposits. As above mentioned, these deposits include both sandstone and granite. The sandstone is in great variety as well as limitless quantity. Red sandstone, green sandstone, and sandstone silver-edged are all found, and are all ready of utilization. The red sandstone, the same stone which in beauty of tint, ease of workmanship and durability of texture has made the Rawlins quarries so famous, is probably the greatest in the Platte Valley deposit. This stone is found chiefly in the near vicinity of the Platte river, usually cropping out of the soil of the first and second upland benches. The ledge in which exists the great red stone quarries of the future and the Platte Valley is situated on the ranch of Wm. H. Cadwell, the same splendid area of bottoms and uplands within whose limits are the famous Saratoga hot springs. The ledge is apparently limitless in deposit and is most excellent in character. In its soft, red hue it is lovely, yields readily to the chisel, and after being exposed to the air becomes as hard as chilled steel, opposing a front at once polished and imperishable to the attacks of time and the assaults of wind and weather. Within a few steps of the Saratoga Hot Springs Hotel, and sheltering the numerous outhouses of that building as with a rampart of iron, there rises a bold and jutting clift of this red stone, its massive and weather-beaten front grimly guarding untold quarry riches. Two miles east of the town of Saratoga there begins an immense deposit of sandstone, green in color. This peculiar hue is given the stone by general, closely diffused copper stains, the natural color of the stone being a pure clear white. In geological formation and character this stone is identical with the world famous silver sandstone of Silver Reef, Idaho."

THE GREAT EXPLOSIVES.

The composition of some of the modern high explosives is as follows: Dynamite—75 parts of nitro-glycerine and 25 of infusorial earth. Dualine—80 parts nitro-glycerine and 20 of nitro-cellulose or gun cotton. Rendrock—40 parts nitro-glycerine, 40 nitrate of potash or soda, 13 of cellulose and 7 of paraffine. Giant powder—36 parts of nitro-glycerine, 48 of nitrate of potash or soda, 8 of sulphur and 8 of resin or charcoal. Mica powder—52 parts nitro-glycerine and 48 of pulverized mica. Tonite—52½ parts of gun cotton and 47½ of nitrate of baryta. Blasting gelatine—82 parts of nitro-glycerine and 8 of gun cotton. Atlas powder—75 parts of nitro-glycerine, 21 of wood fiber, 5 of carbonate ot magnesia and 2 of nitrate of soda. Rackarock—77.7 parts of chlorate of potash and 22.3 of nitro-benzol.—*Engineering.*

INYO MARBLE.

For many years it has been known that California contained marble of a very superior quality, but until recently it has been almost entirely undeveloped, notwithstanding the fact that this State imported large quantities of Italian marble. The Inyo quarries have recently passed into the hands of energetic business men who are developing their resources. The stone has recently been examined by Wm. W. Wilkins, of Proctor, Vermont, who pronounces it of a very superior quality, of fine color, nearly white and of fine texture. There are other marbles in California of different colorings which will in time demand attention.

"I am raising the rent," was the soliloquy of a seedy man, as he took an extra hitch in his suspenders, and immediately the rent went up out of sight under his coat-tails.—*Binghamton Republican.*

COST OF QUARRYING.

Mr. Roger Rigly recently read a paper before the Western Pennsylvania Mining Institute upon the "Cost of Excavating and Handling Rock. Among other things he said:"

The average weight of a cubic yard of sandstone or conglomerate in place is given as 1.8 tons, and of compact granite, gneiss, limestone, or marble, two tons, or an average of 1.9 tons, or 4,256 pounds. A cubic yard when broken up ready for removal increases about four-fifths in bulk, and one-fourteenth of a cubic yard, or 177 pounds, is a wheelbarrow load. Experience shows that with wages at $1 per day of 10 hours, 45 cents per cubic yard is sufficient allowance for loosening hard rock. Soft shales and allied rocks may be loosned by pick and plow at a cost of 20 cents to 30 cents per cubic yard. The quarrying of ordinary hard rock requires from ¼ pound to ⅓ pound, and sometimes ½ pound, of powder per cubic yard. Drilling with a churn driller costs from 12 to 18 cents per foot of hole bored. Upon these data Mr. Rigly estimates the total cost per cubic yard of rock in place, for loosening and removing by wheelbarrow (labor assumed at $1 per day of 10 hours), as follows: When distance removed is 25 feet total cost equals $0.537, wheu 50 feet $0.549, when 100 feet $0.573, when 200 feet $.622, when 500 feet $0.768, wheu 1,000 feet $1.011, and when 1,800 feet $1.401. This is exclusive of contractor's profit.

When labor is $1.25 per day, add 25 per cent to the cost prices given; when $1.50 per day, add 50 per cent., and so on. In hauling by cart, the cost of loading, which will be about 8 cents per cubic yard of rock in place, and the additional expense of maintaining the road, must be added. Allowing, then, 851 pounds as a cart load, the total cost per cubic yard is estimated, when removed 25 feet, at $05.96, when 50 feet $0.599, when 100 feet $0.605, when 200 feet $.617, when 500 feet $0.655, when 1,000 feet $0.717, and when 1,800 feet $0 940.

A rich man had a piece of land on which a poor mule was grazing. "I shall harness you," said the man to the mule, "and make you plow this land to grow melons on, of which I am very fond, while the stalks will supply you with food."

To which the mule replied: "If I consent to toil on your plan you will have all the melons and I will be worse off than I am now, inasmuch as I will have to eat dry stalks instead of fresh, green grass. I'll not do it, sir."

"How unreasonable you are," remonstrated the land owner. "Your father never had any food but thistles, and yet worked sixteen hours a day without grumbling."

"Alas! that is true," retorted the mule, "but then, you know, my father was an ass."—*Chicago Express.*

REV. WHANGDOODLE BAXTER ON ADVERTISING.

MY hearers: At one time your popperlar pasture was a membrum ob de press. I was de jerker ob de Arkerdejum leber for moah den foah mumfs, durin' de absence ob de reg'lar molder ob public 'pinion on a drunk, so when I talks ter yer about advertisin' I knows what I'm talking erbout.

De merchant what says he haint got no use for de press ain't got sense ernuff to be an idjot. Hits puffs in de papers what helps lots of merchants ter raise de wind.

When I was kernected wid journalism I notised a remark in de paper ob an old German journalist by de name ob Karl Pretzel, what struck me as being mightily ter de pint.

He wrote: "Dot pishness man dot don't shduck his adfertisement his town paper into, vas no more use as a girl mitout some pustles."

Luff me tole ye somefins. An inch ad in a newspaper does more good den two on a tree or a fence. You shud holler loud when you hollers. De world am too husy ter heah whispers. If yer wants ter add ter yer bizness—Advertise. Dat am de shorest way ter add. De right kind ob eyes for buziness men am advert-ize. Heah! heah! Does yer heah me?

De poick hab said: "O, solertood, whar am de charms dat sages hab seen in dy face?" Huh! Why didn't he ask at de shop ob de man who don't advertise? Dar's enuff solertood dar, de Lawd knows.

I oncet heered a man say: "Hit's all humbug ter talk ter me 'bout advertisin'. I spent more den forty dollars las' yeah in advertisin', and in Janewary I was done sold out by de sheriff. Dat money was wasted, ebery cent ob it."

"What paper did yer put yer advertisin' in?" I axed.

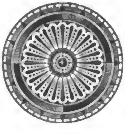
"I didn't put hit in no paper. I jess had my advertisement painted on de fence boards."

Dat's jess what I thunk. De kind ob advertisin' what counts mus' be in newspapers. When you has got yer advertisement in a good paper, keep it dar for deff, and takin' yer ad outer de paper am counted as positive evidence ob goin' onter bizness.

De man who does not advertise,
He shows as much good sense
As de man who puts on his Sunday pants
Ter climb de barbed wire fence.

Yes, bredderen, de business man wid no advertisement in de paper reminds me mightily of de bumble bee widout any stinger. He am only half fixed ter transac bizness.

While de quire sings, "Sound de Loud Trumpet," Uncle Mose or some udder reliable niggah will please pass de hat and rake in a few subscripshuns for dis suffering ex-journalist.—*Texas Siftings.*



CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT.	STRUCTURE	COST.
New York, N. Y.	Philip Braender	Frank Wennemer	Flat building	$ 75,000
New York.	N. Y. HomeopathicCollege	G. Keister	College	95,000
New York.	Fred Rohrs	James Barrett	Two Flats	30,000
New York.	Harry Graham	C. C. Puck	Two Flats	36,000
New York.	F. Yost	Andrew Spence	Two Residences	36,000
New York	W. Broadbelt	Architect Burne	Flat building	52,000
New Yerk	P. Ryan	Architect Burne	Flat building	26,000
New York	P. Ryan	Architect Burne	Flat buildings	68,000
Chicago	James H. Rice	T. V. Wadskier	Residence	16,000
Chicago	Thos. Parker	J. A. Huber	Store and Flat	10,000
Chicago	W. R. Martin	C. A. Weary	Flat	15,000
Chicago		P. W. Ruehl	Flat	18,000
Chicago	Messrs. Maxwell Bros.	W. L. Carroll	Residences	20,000
Chicago	Mrs. Alice M. Kirby	W. L. Carroll	Flat	20,000
Brooklyn, N. Y.	St. John's College Corporation	P. C. Kelly	Church	200,000
Brooklyn, N. Y.	Thos. Rice	S. Harrison	Flat	10,000
Oneida, N. Y.	St. Patrick Church Society	M. H. Hubbard	Church	60,000
Worthington, Minn.	District No. 5	C. A. Shepard	School-house	20,000
Glens Falls, N. Y.	Glens Falls Insurance Co.		Office building	35,000
Ft. Ann, N. Y.	Presbyterians		Church	30,000
Atlanta, Ga.	The City		Stone Wall	12,000
Atlanta, Ga.	Second Baptist Church Society		Church	80,000
Augusta, Ga.	The City		Bridge	100,000
Cedartown, Ga.	Miller A. Wright		Hotel	15,000
New Orleans, La.	Knights of Pythias		Hall	150,000
Camden, S. Ca.	Orpheus Society		School	10,000
Belair, Md.	Second National Bank		Bank Building	60,000
Fordyce, Ark.	The City	Mayor	School	15,000
Birminghan, Ala.	Catholics	Bishop O'Sullivan	Church	
Montgomery, Ala.	Company	W. T. Chandler	Hotel	50,000
Boston, Mass.	The City	Wait & Cutter	Court-house	200,000
Leavenworth, Kans.	Alexander Caldwell		Business Block	40,000
Ness City, Kan.	The Ness County Bank		Stone Bank building	12,000
Mt. Sterling, Ky.	The City	James A. Bassell	School	9,000
St. Paul, Minn.	A. H. Mayall	Architect Coxhead	Store Building	30,000
Detroit, Mich.	The City	Hess & Raseman	Court-house	50,000
East Saginaw, Mich.		George Edbrooke, Chicago	Building	225,000
Toledo, O.	The City	E. G. Fallis & Co.	Library building	40,000
Santa Barbara, Cal.	The City	Thos. Nixon	Hall	20,000
Pasadena, Cal.	R. Williams	H. Ridgway	Office building	80,000
New York City	E. F. Jones	E. Smith	Storage-house	25,000
New York City.	A. A Teets	J. A. Webster	Residence	11,000
New York City.	Sam'l Watkins	J. A. Webster	Flat	16,000
New York City.	H. Toulmin	H. Toulmin	Flats	52,000
New York City.	Mahon & Coyne	Wm. Graul	Flat	22,000
New York City.	Louis Seitz	M. A. Morris	Flat	25,000
New York City.	S. Pottier & Co.	J. M. Dunn	Factory	12,000
New York City.	M. Schlansky	F. Wandelt	Factory	19,000
New York City.	Geo. Erdman	A. B. Ogden & Son	Six Flats	120,000
New York City.	Evelyn Smith	G. B. Pelham	Five Flats	70,000
New York City.	Emil Roessert	E. Wenz	Four Tenements houses	56,000
New York City	August Levestre	Rentz & Lange	Flat	18,000
Chicago, Ill.	Presbyterians	Jno. T. Long	Stone church	80,000
Chicago	John Berry	Flanders & Zimmerman	Block	70,000
Chicago	August Wendell	L. Klinkerfues	Store & Flat	30,000
Chicago	S. S. Floyd	Fred Bauman	Residence	12,000
Chicago	E. W. Elthick	F. B. Townsend	Store & Flat	30,000
Chicago	John Krost	L. Klinkerfues	Store Flat	10,000
Chicago	Emanuel School	Fred Ahlschlager	School-house	15,000
Chicago	Mr. Livingstone	Furst & Rudolph	Residence	11,000
Chicago		John Duncan	Residence	10,000
Chicago		W. B. Cowles	Flat	20,000
Albany, N. Y.	Sisters of the Good Shepherd		Building	
Los Angeles, Cal.	Fred. Eaton	J. N. Preston & Son	Office building	130,000
Los Angeles, Cal.	J. D. Hyans		Business Block	40,000
Los Angles, Cal.	Alex. Kinney	Gibson, Dorn & Slocum	Business Block	20,000
Los Angeles, Cal.		W. A. Spalding	Block	40,000
Brooklyn, N. Y.	International Tile Co.	A. B. White	Block	22,500
Brooklyn, N. Y.	R. C. Wittam	Wm. Danmar	Flat and Store	16,000
Brooklyn, N. Y.	C. H. Collins	J. G. Glover	Dwelling	25,000
Hudson, Mass.	T. H. Chamberlin	S. S. Woodcock	Residence	10,000
Boston, Mass.	W. H. Campfield		Residence	10,000
Boston, Mass.	E. P. Jones		Block	30,000
Dayton, O.	E. J. Barney	S. S. Beman	Residence	60,000
Alexandria, Ky.		A. Druiding, Chicago	Church	18,000
Boston, Mass.		Gilson, Allen & Savage	Tenement Houses	100,000
East Saginaw, Mich	Isaac Baringer		Office Building	225,000
Duluth, Minn.	The City	Palmer & Hall	School-house	50,000
Superior, Wis.	The City	Palmer & Hall	School.house	25,000
Toronto, Can.	Board of Trade		Building	200,000

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT'	STRUCTURE.	COST.
Worthington, Minn.	The City	Board of Education	School-house	$ 20,000
Pittsburg, Pa.	Arch-st M. E. Church	J. P. Bailey	Church	35,000
Lincoln, Neb.	Y. M. C. A.	P. Fisk	Building	60,000
Springfield, O.	Knights of Pythias		Hall	25,000
Staunton, Va.	Y. M. C. A.		Building	20.000
Pittsburgh, Pa.	Masons		Temple	150,000
Cleveland, O.		T. E. Burke	Foundry	9,000
Detroit, Mich.	Globe Tobacco Co.	Scott & Co.	Factory	40,000
Alleghany City, Pa.	Kiefer & Stilel	C. M. Bartberger	Building	11,000
Cincinnati, O.	A. Mesmer	G. & A. Brink	Factory	11,000
Eau Claire, Wis.	Hotchkiss & Smith M'f'g. Co.		Refrigerator Factory	10,000
Pittsburg, Pa.	J. A. Harbaugh	S. Munsch	Business Block and Hall	8,000
Hartford, Conn.	Andrew Heublein	J. Bachmeyer	Store and flat	12,000
St. Paul, Minn.		J. M. Doherty	Store and flat	72,000
Rutland, Vt.		Arch't Patch	Bridge	15,000
Binghamton, N. Y.	Eratus Rop	T. I. Lacey & Son	Office building	30,000
Patterson, N. J.	James Bell	F. Wm. Rumpl	Flat	25,000
East Boston, Mass.	Trinity Baptist Church	Arch't Silloway	Church	12,000
Omaha, Neb.	Immanuel Ass'n for Works of Mercy	John Latimer	Hospital	50,000
Malden, Mass.	The City		School-house	40,000
Togus, Me.	The City		Hall	10,000
Boston, Mass.	The City	Longfellow & Harlow	City Hall	175,000
Evansville, Ind.	Business Men's Building Ass'n.	Reid Bros.	Opera-house	150,000
Lincoln, Neb.	W. J. & M. R. Turner	J. Tyler	Art Gallery	10,000
Catskill, N. Y.			Armory	20,000
Spokane Falls, W. T.	J. D. Sherwood	Allen & Kenway, Boston	Store and Flat	40,000
Atlanta, Ga.			Hotel	200,000
Baltimore, Md.	Bagby & Rivers		Warehouse	25,000
Franklin, La.	John B. Lyon		Sugar Factory	1,000,000
Louisville, Ky.	Caroline Rapp		Residence	10,000
Cambridge, Mass.	F. H. Rindge		School	100,000
Mexico, Mex.	Vera Cruz Railroad		Bridge	100,000
New York City	Nicholas Henry	C. C. Churchill	Stable	18,000
Detroit, Mich.	Dan'l Scotten & Co.	Scott & Co.	Block	20,000
Detroit, Mich.	Heuman Roehm	Scott & Co.	Residence	15,000
Detroit, Mich.	R. R. Goodell	Scott & Co.	Residence	15,000
New Britain, Conn.	Giovani Fiora		Residence	22,000
Litchfield, Conn.		Robt. W. Hill	Courthouse	20,000
Danbury, Conn.	Geo B. Sherman	Joseph A. Jackson	Residence	10,000
Winsted, Conn.	M. H. Tanner	Robt. W. Hill	Residence	14,000
New Haven, Conn.	C. Cowles & Co.		Factory	
Camden, Ala.	The City		Jail	13,500
Birmingham, Ala	Pioneer Iron & M'g'f. Co.		Rolling Mill	10,000
Auburn, Ala.	Agriculture & Mechanical College	F. M. Scott	Assembly Hall	
Hagerstown, Md.	Baptists		Church	10,000
Washington, D. C.	Church of the Covenant		Tower	22,500
Washington D. C.	Mrs. M. A. Casey		Residence	15,000
Washington, D. C.	Baltimore & Potomac R. R. Co.		Freight Depot	12,000
Washington, D. C.	S. D. Newton		Building	9,000
Washington, D. C.	W. C. Hill		Building	15,000
Washington, D. C.	P. J. Lockwood		Residence	9,000
Winona, Miss.	Farmer's Alliance		Factory	100,000
Blowing Rock, N. C.	Abernathy Bros.		Hotel	25,000
Greensboro, N. C.	Richmond & Danville R. R. Co.		Depot	30,000
Raleigh, N. C.		Dr. Everett	Hotel	100,000
Raleigh, N. C.		S. J. Montague	Factory	15,000
Anderson, S. C.	Masons		Hall	15,000
Aiken, S. C.	Aiken Co. Loan & Savings Bank		Office and bank building	
Chattanooga, Tenn.	The Messrs. Lamar		Stone Block	
Nashville, Tenn.	T. L. Herbert		Residence	10,000
Nashville, Tenn.	I. Loventhal		Residence	30,000
Findlay, O.	A. L. Davis	Geo. Horn	Business block	16,000
Pittsburgh, Pa.	Andrew Knox	S. Munsch	Store and flat	10,000
Chicago, Ill.	Peter J. Hurter	Julius Zittell	Factory	25,000
Chicago, Ill.	L. W. Pierce	H. B. Seeley	Building	85,000
Appleton, Wis.		A. W. Patton	Residence	15,000
Anderson, S. C.	Anderson Hotel Co.		Hotel.	
McMinnville, Ore.	The City		Courthouse	45,000
Herington, Kan.	The City		School-house	12,000
Detroit, Mich.	Michigan Salt Ass'n		Warehouse	9,000
Patterson, N. J.	Wm. E. Bremkamp		Store and flat	10,000
Augusta, Ga.	The City		Bridge	100,000
Dallas, Tex.	Oram & Chilton		Store building	15,000
Waynesboro, Va.	Stock Company		Hotel	10,000
Huntington, W. Va.	Geo. McKendree.		Bridge	
Starkville, Miss.	Rev. Mr. Latimore		Church	14,000
Chicago, Ill.	James McDonough		Flats	11.000
Chicago, Ill.	J. M. Van Osdel & Co.	P. Casey	Factory	20,000
Chicago, Ill.	H. Kutschmer	Henry Hildinger	Flat	16,500
Chicago, Ill.	J. M. Buel	E. Gallauner	Residence	16,000
Chicago, Ill.	E. Lundin	S. Linderoth	Flat	9,000
Lincoln, Neb.	G. Ensign	J. Tyler	Residence	10,000
Council Bluffs, Iowa	A. W. Askwith	S. E. Maxon	Residence	10,000
Brooklyn, N. Y.	T. H. Robbins	D. F. Thomas	Flat	10,000
Brooklyn, N. Y.	John Fisher	Amzi Hill	Residence	10,000

PRICE CURRENT.

ARTIFICIAL STONE.

(C A Stevens, Lansing, Mich.)

	Sq ft
Sidewalks	12½c
Building stone, plain	20 c

BLUESTONE.

(Lord & Griswold, Chicago.)

New York	45c
Wyoming Valley	45c

BLUE FLAG STONE—

(J. G. Barger, Goodyear's, Cayuga Co., N. Y.)

Prices f. o. b. Atwater, on L. V. R. R. and Cayuga Lake.

	Sq. ft.
Rough and Wavy Flag.	
2, 3 and 4-ft size	5c
5 and 6 "	6c
Split Flagging.	
2 and 3-ft. size	6c
4 "	7c
5 and 6 "	8c
Smooth Split Flagging.	
2 and 3-ft. size	8c
4 "	9c
5 "	10c
6 and 7 "	11c
Solid Rock, per cubic foot	50c
Platforms, 4 in. thick.	Sq ft.
Less than 25 sq. ft.	16c
25 and less than 40 sq. ft.	20c
40 " 50 "	25c
60 " 60 "	30c

Platforms containing more than 60 sq. ft. prices given on application. For platforms more than 4 in. thick, add 6c per inch for every inch over 4 inches up to 8 inches; over 8 inches thick prices given on application. Special advantages for furnisheing large platforms.

For planing and jointing, per sq. ft.	25c
For planing, jointing and heading, per sq. ft.	30c

[Forest City Stone Co., Cleveland, O.,]

(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches.	20
	Sup. ft.
Flagging—	
4 to 6 inches thick, natural bed, any size up to 12 ft. long	12c

EUCLID BLUE AND COLUMBIA SANDSTONE—

Sawed Flagging.

1 in. thick	10c
2 "	10c
2½ "	12c
3 "	14c
4 "	18c

BROWNSTONE—	cu. ft
Ohio—No. 1 Promiscuous blocks	60c
No. 2 " "	40c
Ashland Wis.—Promiscuous blocks	60c
Connecticut—No. 1 " "	95c
No 1 " "	85c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscous blocks	40
No. 2. " "	30c
No 1. Monument Bases, broken to size	45c
No. 2. " " " "	35
Engine beds, broken to size,	40
Perch or Wall Stone, per ton railroad weight	30c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	60

NORTH RIVER BLUESTONE—

(Union Bluestone Co., New York.)

Flagging.

Rough Flag, promiscuous sizes	$ 9
Smooth " " "	10
2 and 2.6 Smooth Flag, 1½ in. and over	12
3 " 3.6 " under 1½ in. thick	11
3 " 3.6 " 1½ in. and over	13
Cess-Pool Flag, 2 to 2.6 in. square, 3 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1¼ and under 1¾ in. 2 ft. and over wide, wide	13
4 and 4 6 in. smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in.	23
5 ft. " " " 3 in.	25
5 and 5.6 Smooth Flag, 2 in. and over	17
5 and 5.6 " " under 2 in.	15
6 and 6 6 " " 2 in. and over 18	18
6 and 6 6 " " under 2 in.	16
Well Stone, 3 to 3½ in. thick, 4 to 4 6 in. square	24
Well Stone 3 to 3½ " 5 to 5.6 "	28

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag

6 ft. to 6.6, x 5 to 6 ft. wide	$ 22
7 ft. to 7.6, x 4 to 5 ft "	24
8 ft. to 8 6, x 4 to 6 ft. "	28

The above to be 2½ inches thick.

Promiscuous Large Flag.

30 to 50 ft. 3 in. thick	28
50 to 70 "	38
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thickness at special prices.

For planing add 22 cents.

For rubbing add 35 cents.

Window Sills and Lintels.

3 x 8 in. Quarry cut	22
4 x 8 in. " "	21
5 x 8 in. " "	29

½ in. allowance in thickness.

Door Sills.

5 x 12 in. Quarry cut }
5 x 14 in. " " } 3½ cts. per in. in width
5 x 16 in. " " }

8 to 10 ft. long, add 10 cts. per foot.

Curb, Quarry Cut.

Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in. thick	27
14 " under 4 in. "	28
14 " 4 in.	32
16 " bev'd, under 3½, 3 ft. and over, long	31
16 in. Curb, 3½ to 4, 4 ft. and over, long	35
18 " 3½ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	55
16 in. Corners, per set	5 50
20 " "	8 50

Special prices given on all sawed and jointed curb, according to requirements.

Gutter and Crossings.

12 in. gutter, 3 to 3½ in	17
12 in. " thin	14
14 in. " 3 to 3½, in. 3 ft. and over, long	20
14 in. " thin, 2 6 and over, long	18
16 in Belgian Bridge, 4 in. thick	44
20 in. " " 4 in thick	55
24 in. " " 4 to 4½ in	65
24 in. " " 5 to 6 in	77
24 in " " 7 to 8 in	90
19 in. Bridge Flag Joints, 3½ in.	28
20 in. " " " 3½ in.	40
24 in. " " " 4 in.	50

Coping

11 in Coping, 2 to 3 in	28
14 " 2½ to 3 in	29
16 " 2½ and under 3½ in.	40
16 " 3½ to 4 in	45
18 " 3½ to 4 in	60

20 in. to 36 in. Coping, 4 in. thick, 3¼ cents per in. in width. When ordered over 4 in. thick, special price will be given.

When ordered under 4 in. thick, 3 cents per in. in width.

Steps.

6 x 12 in. promiscuous lengths, under 8 ft.	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft. and up to 10 ft. long, add 10 cents per foot.

Rock

Promiscuous Rock, per in. in thickness	9
Dimension Rock, per in. in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 Inches Thick

Under 20 feet	30
20 feet and under 35 feet	35
35 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price.

Above, if dimension both ways, add 10 per cent.

For 5 in. add 10 cts.
" 6 " 20
" 7 " 30
" 8 " 40
" 9 " 55
" 10 " 65
" 12 " 100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.

4x8 in.	43
5x8 in.	50
6x9 in	60
5x12 in.	77

½ in. allowance in thickness.

Rubbed Lintels.

3½ to 4 x 10½ in. under 8 ft.	48
8 ft. and under 10 ft.	60
4 in. x 13 in. under 8 ft. in length.	67

Rubbed Curb.

2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in.	48
12 " " " 4 in.	55

Rubbed Mantels.

4 x 10 in	55
4 x 12 in	65
4 x 14 in	75

Dimension lengths with heads, measure heads.

Rubbed Hearths

3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4.6 in. long, 1.4 to 2 ft. wide	33
" 4.6 to 5.6 " 1.4 to 2.6 in wide	40
" 5.6 to 6 6 " 1.8 to 3 ft. wide	45
" 6.6 and under 8 ft long, 2 to 4 ft. wide	65

Rubbed and Jointed Tile.—Boxed.

Under 2½ in. thick, 12 to 30 in. square, per superficial ft.	55

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.

3 ft. and 3 ft. 6 in., 1 ft. 6 in. and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 5 " 6 " 2 " "	39
6 " 6 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashlar and all kinds of trimmings for buildings, special prices given.

Cemetary and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

Trade discounts on application.

BROWNSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, unless otherwise mentioned.]

	Cu. ft.	
Carbondale, light	70c.	f. o. b. quarry
" dark	95	" "
Hummelstown	45	" "
Lake Superior { Marquette	1 00	" Chicago
Lake Superior { Rain Drop	1 00	" "
Trenton	50	
Linden	50	
New Brunswick	45	
Kibbie—Massachusetts	65	

OHIO BROWNSTONE—

	Cu. ft.
Killbuck	45c
Gann	45c
No. 1. Promiscuous blocks	45c
No. 2. " "	30

Stone ordered to dimension sizes 10 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT BROWNSTONE—

(Middlesex Quarry Co., Portland.)

	Cu. ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft. and over, price to be agreed upon.	
	Superficial
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft. long, promiscuous sizes	63
Platforms, Cornice, etc., 7 to 8 in. thick, under 18 superficial feet	85
Platform, Cornice, etc., 18 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	1 13
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashlar, under 4 in. thick	20
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 8 in. promiscuous lengths	63
Steps. Lintels. etc., 14 and under 18 in. wide, 8 in. thick and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps. Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu. ft.	1 50
" " 20 cu. ft. and over, price to be agreed upon.	
Monumental Stone, 8 to 12 in. thick, charged 12 in.	
Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in. thick	56

Discount 5 per cent.; cash or approved Notes, at two months.

FREESTONE.

(Lord & Griswold, Chicago.)

New Brunswick brown	.45c
Buena Vista	.40
Ohio	.30
Long meadow, brown	.60

GRANITE.

(Lord & Griswold, Chicago.)

Westerly	
Monson	.65c
Woodstock	.65c
Mica Stone	.50c
Port Deposit	.65c

GREEN STONE.

(Lord & Griswold, Chicago.)

Pennsylvania	.50c

LIME, CEMENT, ETC.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs.	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	50
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " 1 " " " "	35
Fire brick Savage per 100	[illegible]
" " Aetna " "	.0—
" " Montezuma " "	.10
" " West Virginia " "	.12
Ground fire clay, best, per bushel	.14
" " " common " "	.18

Discounts

Vitrified sewer pipe	50 per cent
Flue Pipe for Chimneys	25 " "
Terra Cotta Chimney Tops	25

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f.o.b. Erie.

LIMESTONE.

(Lord & Griswold, Chicago.)

	Cu. ft.
Salem, Bedford	25c f. o. b. quarry.
Oolitic, " buff	25 " "
" " blue	35 " "
Oolitic Bowling Green	25 " "
Artesian	35 " "
Grafton	35 " "

MAGNESIAN—

(J. A. Green, Stone City Iowa.)

Dimension Stone—(First Quality of all ordinary sizes.)		
12 inches and over, per cubic foot	$	35
11 to 12 inches, per superficial foot		30
9 to 10 " " " "		27
7 to 8 " " " "		26
6 inches, per superficial foot		20
5 " " " "		17
Vault covers—(Large size.)		
7 to 8 inches thick, per square foot	$	30
6 to 7 " " " " "		25
Flagging Stone—(Ordinary size.)		
5 inches thick, per square foot	$	17
4 " " " " "		12
3 " " " " "		10
Bridge Stone.		
Common, per cubic yard	$	2 80
Coppings, " " "		6 75
Pedestal Bases, per cubic yard		6 75
Footing Stone.		
Dimensions, per cubic yard	$	3 25
Common, " " "		2 50
Rubble or Building Stone.		
Common Rubble, Per 100 lbs		2½c
Select Rubble, " 100 "		3½
Block Rubble, " 100 "		4
Drilled Rubble, " 100 "		5
Street Crossings.		
5 to 6 inches, per superficial foot	$	15
Curbing, 5 to 6 inches thick, per superficial ft.		15
Cut and Rubbed Stone—(Finished Ready to lay in their place.)		
Ashlars per sq. ft. measuring all that shows	$	60
Base		70
Corner Blocks		
Platforms, per superficial foot		60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "

A perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

(Lord & Griswold, Chicago.)

JOLIET	Rubble, $6 cord; dimension 30c
Planed sidewalk, Chicago	64c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts. per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts extra per superficial foot.

Rough Stone.

Mill Blocks as quarried, per cu. ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft	15c
Promiscuous good select Bridge Stone, cu. ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 on bed, suitable for dressed rock faced work, $10 load.

iscount, rough 10 per ct., sawed, 20 per ct.

ount 3 per ct., on rough and dimension, and 5 awed.

[Big 4 Limestone Co., New Point, Ind.]

Prices on cars at quarry, the buyer paying freights.

Flagging for Sidewalks.

	In Rough.	Jointed.	Jointed and 4 cut Hammered.
3-inch	10c	13c	20c
4 "	16c	21c	26c
5 "	17c	22c	27c
6 "	18c	24c	30c
7 "	22c	28c	34c
8 "	24c	30c	35c
9 "	26c	32c	39c
10 "	28c	36c	43c
11 "	30c	38c	44c
12 "	32c	40c	45c

2c extra when over 14 feet long or in strips less than 2 feet broad.

Platforms.	In Rough	6-cut Face, 8-cut Edges.	8-cut Face 10-cut Edges.
6-inch	23c	54c	65c
7 "	24c	55c	65c
8 "	28c	58c	65c
9 "	30c	58c	65c

Block Stone.	Cu. ft.
12 inches thick or over	——
Irregular sizes, 20 to 70 ft.	30c
Special sizes	33c
Faces	33c

Block stone less than 12 in. thick at Flagging Prices

Bridge Stone.	Ton of 2,000 lbs.
First-class, dressed	$2 25
" undressed	1 30
Second-class	1 10
Coping, 12 in. thick and over	2 15

" less than 12 in. thick at flagging prices.

Building stone.	Ton of 2,000 lbs.
Riprap	$0 25
Ordinary Rubble.	50
Range Rubble (select)	1 00
Scrap Flagging	1 50

Range stone 6 to 10 in. thick, 6 to 10 in. wide, 18c lin. ft.

Jail Stone.	6-cut Hammered.
6-inch, one side dressed	34c
both sides dressed	46c
7-inch, one side dressed	38c
both sides dressed	50
8-inch, one side dressed	42c
both sides dressed	54c
9-inche, one side dressed	46c
both sides dressed	58c

Door Sills and Steps

6-inch, per sup. foot in rough	Sq. ft.	20c
7 " " " "	"	25c
8 " " " "	"	30c
Ordinary dress, 6-cut edge, 4 cut face	Sup. ft.	50c
Extra dress, 8-cut edge, 6-cut face	"	55c
" " 10 " 8 "	"	65c
Sawed sills of all kinds per sup. foot		——

Strips less than 12 inches wide same price per lineal foot as Sills and Steps are per superficial foot.

Culvert Covering and Footings.

Same price as Footings.

Irregular sizes,	8 to 9 in. thick, 11c	10 to 12 in. 12c
Dimension "	8 to 9 in. thick, 13c	10 to 12 in. 14c

Crushed Stone.

In orders for 25 cars and over	35c per ton
" of less than 25 cars	40c "

Invert Stone for Sewers

9x20 in. x 2 ft. radius	95c lineal foot.
9x20 in. x 3 ft. "	90c "

Pier Stone.

Stone in rough, 25c per cubic foot.

The thickness optional with consignor.

If dressed, add to price of stone in rough for bedding and pitching face, 18c per cubic foot. For bedding and tooth axing face, 25c per foot face measure.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	15
3 " " " "	12

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	22
Stone 8x7	21
Stone 8x6	20
Stone 8x5	16
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $1.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing

10 to 12 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone,

$1 to $1.50 per cubic yard.

Rip Rap.

$1 to $2.50 per car load.

MARBLE.

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial in.							Monumental.
	⅞	1	1¼	1½	2	3	4	
Dark Veined Blue	25	30	35	50	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	55	55	82	1 10	4 00
Ex. Dk. Veined Blue	35	40	50	60	60	90	1 20	4 50
Ex. Dk. Mottled Blue	40	45	55	70	70	1 05	1 40	5 00

Dark blue base strips and posts, per cubic foot	$1 75
Dark blue bottom bases per cubic foot	1 75
Dark blue bottom bases defective, per cubic foot	1 25
Dark blue markers, 0.10 to 1.2 long, 3 in. thick each	50
Dark blue markers, 0.10 to 1.2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 8 in wide, assorted sizes each.	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra cubic foot	50
Strips ordered 7 0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing per cubic foot.	25
Boxing " "	25

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental
Statuary	90	1 15	Same as 2 inch	1 35	2 00	2 70	8 50
No. 1	75	90		1 10	1 65	2 20	6 50
Average	60	70		75	1 12	1 50	5 25
No. 2	40	45		55	72	1 10	4 25
Rutland Italian	30	35		55	82	1 10	4 25
Mottled Smith	....	....		40	60	90	3 50
Best No. 3	27	32		35	52	70	3 00
No 3	18	24		25	37	50	2 00
Extra dark and mottled blue	40	50		60	90	1 20	4 50
Dark blue	30	35		50	75	1 00	3 50
Light blue	20	25		30	45	60	2 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in inches.	Diam. Bowl in inches.	Rutland Average. S. F. D. M. V. Mount Dk No. 1	R'tl'd No. 2 ex. dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk Blue. Sutherland Falls Av. Mountain Dark No. 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue. Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	3 40
8	5	2 95	2 85	2 75	2 65	2 55	3 65
9	5	3 15	3 05	2 95	2 85	2 75	3 75
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 80	3 60	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	3 90	3 70	5 50
14	6	4 80	4 50	4 20	4 00	3 80	5 70
12	7	5 15	4 85	4 55	4 35	4 15	5 75
13	7	5 35	5 05	4 75	4 55	4 35	6 25
14	7	5 65	5 25	4 95	4 65	4 45	6 50
15	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 60	6 20	5 80	5 00	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 00	7 10	6 90	6 40	6 00	8 90
16	9	8 80	8 10	7 50	7 00	6 60	9 50
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 50	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 50
18	10	11 35	10 35	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 85	11 75	10 75	9 85	9 25	14 25
24	10	13 75	12 45	11 35	10 35	9 55	15 75
18	11	13 75	12 55	11 55	10 65	9 95	15 80
20	11	14 55	13 25	12 15	11 15	10 35	15 85
22	11	15 35	13 95	12 75	11 85	10 85	16 85
24	11	16 25	14 65	13 35	12 15	11 25	17 85
18	12	15 85	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 85	17 95
22	12	17 75	16 05	14 55	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 35	13 15	......
28	12	20 65	18 45	16 55	14 95	13 65	......
24	13	21 20	19 00	17 10	15 50	14 20	......
26	13	22 50	20 10	18 00	16 20	14 80	......
28	13	23 80	21 20	19 00	17 10	15 60	......
30	13	25 00	22 30	19 90	17 90	16 30	......
24	14	25 80	23 20	21 00	19 10	17 00	......
26	14	27 40	24 70	22 30	20 30	18 70	......
28	14	29 20	26 20	23 60	21 40	19 70	......
30	14	30 90	27 70	24 90	22 50	20 70	......
32	14	32 70	29 20	26 20	23 70	21 80	......

Hearths, 1 in., sawed edges, per sup. foot	$ 24
No. 3 Base strips and posts, cubic foot	1 90
Inferior No. 3 posts and strips "	1 65
" No 3 bottom bases "	1 65
" No. blue posts, strips and bottom bases	2 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4 "	1 00
ootstones, 5 to 8 in., each	30
" sawed heads, each	32
" " sand rub and box	35

SUTHERLAND FALLS MARBLE—

1888	Superficial. 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental.
Mourning veins	53	66	87	92	1 32	1 84	5 40
No. 1	48	59	82	87	1 30	1 74	4 90
Average	38	49	62	67	1 00	1 34	3 90
No 2	28	34	42	47	70	94	3 15
Best No 3	23	29	35	37	56	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Strips and Posts, per cubic ft.	$1 90
Inferior No. 3, Posts and Stripe, per cubic foot	1 65
Inferior No. 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 13 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 3 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup. ft	24

ITALIAN MARBLE—

	Cu. ft.
Monumental stock	$4 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size.
⅝ in slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubic foot.

MOUNTAIN DARK MARBLE—

1888	Superficial. ⅝ in.	1¼ in.	2 in.	3 in.	4 in.	Cu. Monumental.
No 1	53	74	1 07	1 60	2 14	5 90
Average	48	64	87	1 30	1 74	4 90
No 2	37	49	67	1 00	1 34	3 90
No. 3	25	34	58	78	1 04	2 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No 3, Stripe and Posts, per cu. ft.	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

SPECIALS—

Diminished Dies, extra......per cubic foot	60c
Stripe ordered 7 ft. long and over, extra per cubic foot.	60
Sawing edges slabs, 1 inch thick per superficial ft	03
" " " 2 " " " "	06
" " " 3 " " " "	08
" " " 4 " " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock......per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths......per surface foot rubbed.	05

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " " small lots,		12
Sponges	per lb.	75
Red Grit	"	05
Nova Scotia Blue Grit	"	05
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

TOOLS—

¼ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	35
Frosting Tools	per doz.	3 00
⅜ in. Granite Lettering Tools	"	2 50
½ " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mash "	" 2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	3 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb.	each,	$ 50
3 to 5 lb.	"	75
5 to 7 lb.	"	1 25
8 lb. and up	"	1 50

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 3 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 34,000 pounds or more in one order.

Branches of Vermont Marble Co. see price list.

Toledo	40c.
Cleveland	.25
Boston	.50
Philadelphia	.45
Detroit	.40
Chicago	.50
St. Louis	.60

(Lord & Griswold, Chicago.)

		Cu. ft.		
Tennessee Red	$2 50@	$5 00	f. o. b.	Chicago
" Knoxville		3 00	"	"
Vermont White	3 50@	8 00	"	"
Ophite	4 50@	5 00	"	"
Armedite		1 50	"	"

GEORGIA MARBLE—

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches think, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$6 50	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 60
Cherokee, average	2 75	3 10
No. 3 base Stripe and Posts.	1 50	1 95
Inferior No. 3 Posts and stripe	1 25	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each.	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	65
Markers, 16 to 18 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	25	35
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 3 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	50
Stripe ordered, 9 feet long or over, extra	50	50

Urn list, sent on application.

(Columbian Marble Company.)

SAWED MARBLE.—

Columbian Dark.

	per cu ft.
Extra dark variegated	$5 00
No. 1. dark variegated	4 50
No. 1 dark mottled	4 50
No. 2 dark	3 50
Pearl blue	3 50
Inferior dark base and stripe	1 75

Columbian light.

Light medium Cloud	$4 50
Best light cloud	3 50
No. 2 light cloud	2 50
No. 3 light cloud	2 00
Inferior light	1 25

	Per superficial foot. 1 in.	1¼ in.	1½ in.
Extra dark variegated	.50	62	80
No. 1 dark variegated	.40	55	75
No 1 dark mottled	.40	55	75
Pearl blue	.35	45	55
Light medium cloud.	.40	55	75
Best light cloud	.35	45	55
No. 2 light	.25	30	.35
No. 3 light	.18	22	.25
Hearth, sawed edges	.20	—	—

Sawed marble.

	each.
Footstones, 5 to 8 inches	$ .20
Footstones, 5 to 8 inches, sawed heads	.22
Footstones, 5 to 8 inches, sawed heads, sanded and boxed	.28
Footstones, 5 to 8 inches, oval heads	.28
	per cu ft.
Diminished dies, extra	$ .50
Strips and posts, 7 feet and over, extra	.50
Sand rubbing	.35
Boxing	.25

All monumental stock will be boxed, with the exception of base strips and posts, unless otherwise ordered.

Building marble, tile and curbing. Prices given on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

	cu. ft.
Extra dark veined	$4 50
Dark blue	3 50

MACHINERY.

STEAM PUMPS—

	Discount
Smedley's	25 per ct.

PULVERIZERS—

	Discount
Cyclone	20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete	$400

EXCAVATORS—

Little Giant	$4,500
Railroad Giant	6,500

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting. Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bollock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20	25.00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$50.00
" 0	" " " " with "	54.00
" 1	" 31x27, " 10 with hood	40.00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 5,	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Steel "Hercules"	42½ per ct.
Steel	42½ "
Gal. Iron	35 "
Iron	35 "
Wire Rope Blocks	25 "

(Washburn & Moen M'f'g. Co.)

Iron	33⅓
Steel	37½
Gal. Iron	33⅓

BLOCKS AND TACKLE—

(Toledo Block Works.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron-bushed	2 40	4 50	6 30
10 " "	3 30	5 80	8 60
12 " "	4 50	8 00	11 50
14 " "	6 75	10 50	14 00
16 " "	9 00	18 50	24 00
18 " "	15 00	29 00	40 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	5 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00
Wrought-iron Tackle Blocks	Single	Double	Triple
6 inch	1 40	2 25	2 75
8 "	2 40	3 50	4 50
12 "	4 55	8 10	10 40
16 "	9 55	16 70	22 00
20 "	22 00	33 40	50 00

Iron-bushed, discount 20 per cent.; roller-bushed discount 10 per cent.

(Detroit Block Works.)

Discount from list	40 per ct.

WROUGHT-IRON PIPE—

(American Tube & Iron Co.)

	Discount
Butt weld. black	55 per ct.
" " galv.	45 "
Lap " black	65 "
" " galv	55 "

BELTING-RUBBER.—

Standard	60 per ct. and 10 per ct.
X quality	50 " " 10 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	32 00

RED SANDSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	.60c
Dunreith, red	.50c
" variegated	.35c
Darlington	.40
McArthur	.65
Carlisle	.65
Potomac	.50

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft.
No. 1 Promiscuous block	.50c
No 2 " "	.40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	.40c
No. 2 " "	.30
No. 1 Monument Bases, broken to size	.45
No. 2 " " " "	.35
Pier Blocks " "	.30

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 8 " "	.09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	.25c
6 " " "	.46
9 " " "	.68
12 " " "	.88
3 in. Berea or Blue Amherst	.21
6 " " "	.41
12 " " "	.77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	.10
2½ " "	.12
3 " "	.14
4 " "	.18

SPLIT PLATFORMS—

	Superficial feet. 5in.	12 in.
No. 1 Buff Amherst	25c	60c
No 2 " "	20c	50
No. 1 Berea or Blue Amherst	20c	50
No 2 " " "	17c	40
No. 3 " " " (for sidewalks)	12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—

	Cu. ft.
Promiscuous Blocks	15c

Write for discounts, etc.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—

	Cu. ft.
No. 1	30c
No. 2	25

(French Fort Quarry, New Castle, N. B.)

Olive	40c f. o b.

(Babbitt Sandstone Co., Ypsilanti, Mich.)

Brown Sandstone	25 f. o. b. quarry

(Lake Huron Stone Co , Detroit, Mich)

Blue Sandstone	30c f. o. b

SLATE.

[Henry Fulmer, Easton, Pa.]

F. O. B. Slatington, Pa.

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 18 cents square foot in car lots.

ROOFING SLATE—

Size.	No. in sq.		Size.	No. in sq.	
14x21	98	$3 50	10x18	192	
13x24	106		9x18	214	
12x24	115		10x16	222	
12x22	127		9x16	247	$3 76
11x22	138		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

[Coulman & Westcott Fairhaven Vt.]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17
For rubbing both faces of above, excepting caps and trusses extra	02
Any of the above unrubbed less	01
Steps, to 5 ft. in length	20
Steps, 5 ft. to 8 ft, "	25
Steps larger	special
Platforms to 16 sup. ft	20
" 16 to 22 " "	25
" 22 to 28 " "	30
" Larger	special

Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft	22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscoting, sup ft	20
Black Boards, ¾ to ⅝ up to 3 ft. wide, crated sup. ft	18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft	20
Black Boards, 3½ ft. to 4 ft wide crated, " "	22
Thresholds to 5 ft in length " "	20
" 5 ft. to 8 ft. " " "	25
Curriers' Slabs, faced one side crated, " "	30
Curriers' Slabs, faced two sides, crated, " "	34
Billiard Table Beds, crated, " "	22
Imposing Stones, " "	30
Grave Covers, sawn and planed only, and in two or more pieces. " "	16
Grave Boxes, rabbeted ends, " "	20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	16
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	20
16 to 22 " "	25
22 to 28 " "	30

Vermont Red	$13 50	f. o. b. Chicago.
" Purple	5 50	" "
" Green	5 50	" "

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x16, 15x20	2 65	"
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 75	" "
Maine	5 50@5 80	" "

BLACK—

(Michigan Slate Co., Lansing.)

Michigan	$5 50 f. o. b. quarry

PURPLE ROOFING SLATE —

(Hazard Slate Company Fair Haven, Vt.)

	First.	Second
24x12	$3 75	$2
22x14	3 75	2
22x12	3 50	2 25
22x14	3 85	2 25
20x12	3 85	2 25
20x10	3 85	2 25
18x12	3 50	2 35
18x10	3 50	2 25
18x 9	3 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	3 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	2 75	2 25
14x 9	2 75	2 22
14x 8	2 75	2 25
12x10	2 50	2 25
12x 9	2 60	2 25
12x 8	2 50	2 25

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SHOVELS—

(Sandford, Fork & Tool Co., Terre Haute, Ind.)

20 per cent. discount 2 per cent. cash

REAMERS—

(Knox Rock Blasting Co., Pittsburgh, Pa.)

	each
3 feet long	$3 00
6 "	5 00
9 "	6 50
12 "	8 00

TOOL STEEL—

(F. E. Brooksbank, Cleveland, O)

Jackson's	16c per lb

[J. H. Knippenberg, Cleveland, O]

Stone Cutters Mallets	$12 00 Doz.

Wooden Rolls for stones 2 feet long	4	5	6	7	8 in.
	20c	35c	50c	65c	75c each

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SEALED PROPOSALS will be received at the Office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M. on the 9th day of October, 1888, for the labor and materials required in the erection of the basement, area walls, first floor beams, etc., of the U. S. Court House, Postoffice, etc., at LOS ANGELES, CAL., in accordance with the specification and drawings, copies of which may be seen at this Office, at the office of the superintendent, the Builders' Exchanges at Milwaukee, Wis., Oakland, Cal., and San Francisco, Cal., the Builders' and Traders' Exchanges at Chicago, Denver, Col., Kansas City, Mo., and Louisville, Ky.

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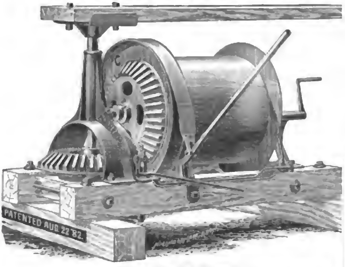
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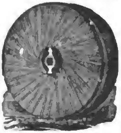

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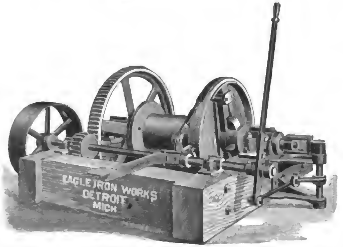

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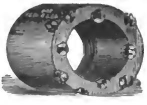

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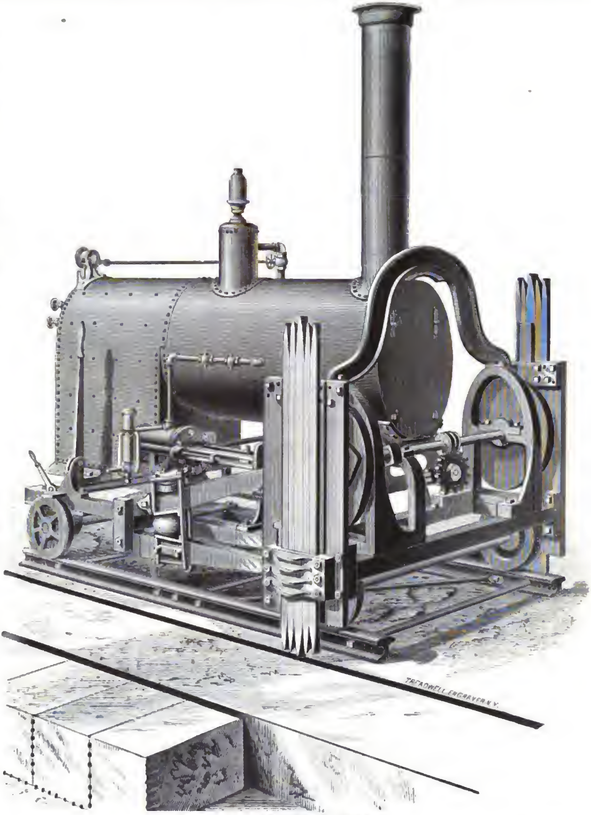
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The **First Design** of this series shall be for a Tablet capable of construction in granite and marble, and shall contain, when finished, not exceeding 30 cubic feet of material above grade.

All of these designs will be published in this journal at the option of the editor. Judgment will be passed upon the designs by three experts, viz.: Mr. J. F. Gookins, artist and art critic and student Le Ecole de Beaux Arts, Paris; Mr. A. A. McKain, President of the National Association of Marble and Granite Dealers, and Louis H. Gibson, architect, a student from the Massachusetts Institute of Technology, Boston, Mass.

The Prize for the first design will be $40 in cash; the second best design in this competition, $10 in cash; the third and fourth will be mentioned in the order of their excellence.

The following drawings, and these only, will be furnished by each competitor:

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Two elevations.

One perspective.

The plan, elevations and perspective are to be drawn on a scale of three-quarters of an inch to the foot. The plan and elevation are to be placed upon one sheet of paper.

The drawings ar to be made on two sheets of egg-shell or two-sheet bristol board 13x20 inches in size, surrounded by a single line for a border.

The plan and elevations are to be finished with India ink and drawing-pen. They are to be black lined and no shadows are to be cast. There is to be no brush work except to indicate the sections of the plan. The perspective is to be drawn in line only, without any background or foreground. Pen-and-ink shading will be permitted on the body of the tablet itself. It is particularly desired, however, that it be of a simple character, so as to admit of its proper reduction and reproduction by the ordinary processes of photo-engraving.

Any of the competitors may present more than one design.

Each drawing is to be distinguished by a motto or cipher. A sealed envelope bearing the motto or cipher is to contain the name and address of the competitor.

The drawings are to be delivered flat, between two pieces of strawboard, on or before the 20th day of December, 1888, to

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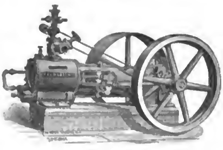

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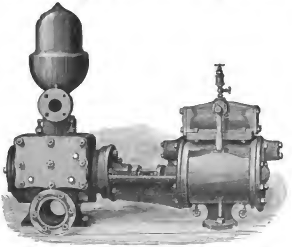

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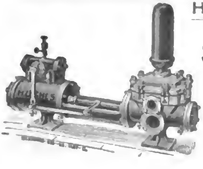

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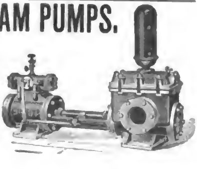

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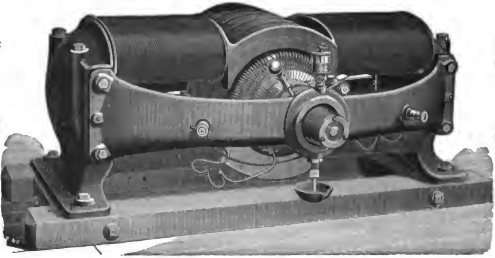

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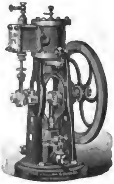

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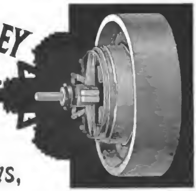

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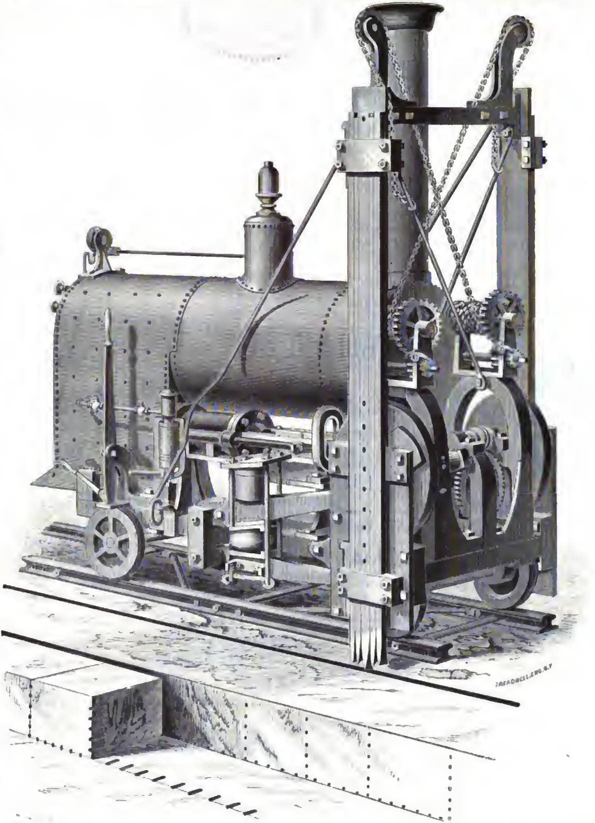

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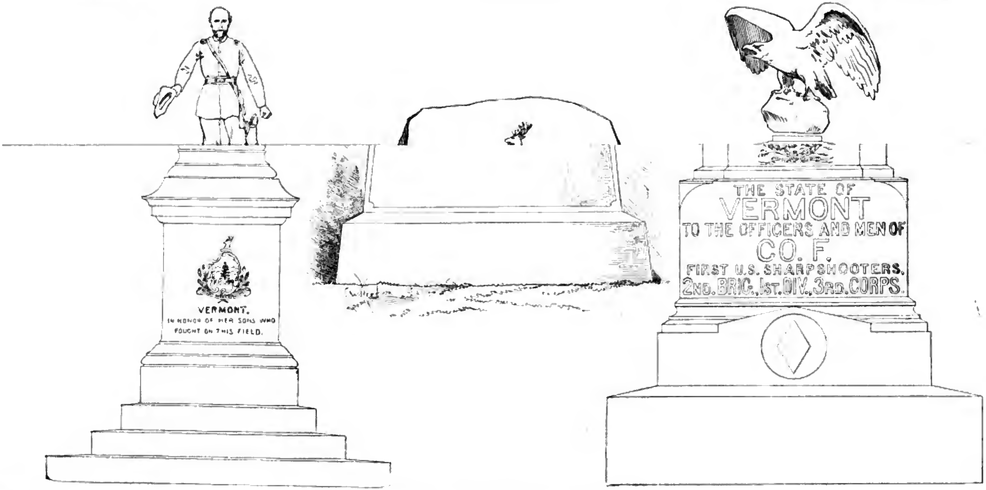
VERMONT.
IN HONOR OF HER SONS WHO
FOUGHT ON THIS FIELD.
THE STATE OF
VERMONT
TO THE OFFICERS AND MEN OF
CO. F.
FIRST U.S. SHARPSHOOTERS.
2ND. BRIG., 1ST. DIV., 3RD. CORPS.

VERMONT MONUMENTS AT GETTYSBURG.

STONE

VOL. I. INDIANAPOLIS, IND., NOVEMBER, 1888. NO. VII.

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

PUBLISHED MONTHLY BY

THE D. H. RANCK PUBLISHING CO.

(INCORPORATED.)

D. H. RANCK, Pres't and Treas. A. K. HOLLOWELL, Vice-Pres't.

LOUIS H. GIBSON, Sec'y.

Office: News Building, near corner of Washington and Illinois Streets.

SUBSCRIPTION PRICE, - - - - $2 A YEAR, IN ADVANCE.

D. H. RANCK, - - - - Managing Editor.

L. H. GIBSON, - - - - - - - Editor.

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It is unsafe to transmit currency or postal notes in the mails as at present managed. We desire our patrons to take notice of this, and *not risk the loss of their remittances* to us. We have lost many valuable letters during the past three years, and we have failed to recover a single one, though we have tried every means to do so. Whether Democrats or Republicans are responsible for this unfortunate condition of the postal service is no concern to us. *We know it is wofully inefficient*—if anything worse now than it was two years ago—and there is no near prospect of improvement. *In sending us money, purchase a money order, express order, or registered letter, or New York or Chicago bank draft.*

IN the October number of STONE we published an article on "Marble and the Tariff." In response thereto we are pleased to have received a communication from Arthur Lee & Bros., of Bristol, Eng., which will be found among our correspondence in this issue. Our correspondents are quite well known to the trade in this country, being engaged largely in the importation and manufacture of Italian marble.

Recurring to the article in last month's issue, the figures of which are reproduced in their communication, they make a plausible argument—from their standpoint—but seem to overlook the fact that in their deductions is found the very strongest argument in favor of the American protective policy. England doesn't produce marble to compete with Italy, while the United States does! Therein is "the milk of the cocoanut," to use a common phrase. But putting aside this fact, and its bearings upon the transaction referred to, our friends cannot see justice in the act of an agent charging a commission on the gross sales price of an imported article. Why not? Does the importing agent fix the sales price of the article in this case? No. He must sell to the consumer at the price fixed by the producer. The producer fixes the price on the cost of production and manufacture and getting it to the point of delivery. Suppose the Italian had sold this monument direct. Let's see: His price would then have been to the customer $105 less the agent's commission, $21, or $84. Deduct $48 freight and duty, and $11.34 cost of stock at quarry, 'which we take at the price given by our correspondents, and there is left for the manufacturer's profit and the cost of his labor, $24.66, not counting the cost of collection account. This may not be as far away from our correspondent's logic as the exhibit first given, but it will answer just as well to prove the beneficent effects of the American tariff system.

We are now considering this case in its relations to our governmental policy of protection as it affects the workingman, which has nothing to do with what a sales agent and a principal may agree to as regulations for their personal business affairs. The rules of trading are one thing, practically unchangeable, and governmental policy is another. It is against the latter that our correspondent's aim. The simple fact that the workingman in this country obtains $66.47 for the same amount of labor that the Italian performs for one-fifth or one-fourth that sum, is the very strongest evidence that could be submitted that the high tariff policy as it affects the manufacture of marble in this country is irrefutably right. What does it matter if the American workingman might, under a free trade policy, pay less for the necessaries of living? Under protection he has undeniably more money to spend, and we assert it as a good principle that it is better to spend a dollar here for what may be obtained for fifty cents in England, than to have only the lesser sum to economize on. It costs the American workingman more to live than it does the free-trade-beneficiary workingman of England, because he lives better—a hundred-fold better—than his equally skilled brother in Great Britain. Everybody knows that who has compared the situations of both.

Our correspondents candidly admit, we think they diffidently confess, the strength of our position, when they assert that England being "a free-trade country, our workingmen have to compete with the labor of the world." Such being the case what else makes the English workingman a pauper? and what else makes the American workingman a prince as compared with him? The system of protection to American industries gives him his home market exclusively—the best market in the world—and it does not keep him out of any other market, either, where his skill and the superiority of his productions gains him access. American skilled labor and American inventive genius is the thorn in the side of our British cousins, which accounts for "the cutting and the contriving" which our correspondents refer to. If we had not the abundant natural resources, and the brain and sinew to develope them to our advantage, and a home market in which to dispose of the product, we might be put into somewhat similar condition to the English people who must perforce look outside their own domain for the material to furnish labor with something to do, and other markets than their own in which to dump their products. The American market belongs to the American workingman, and in this particular instance of the marble industry the tariff of 50 per cent. ad valorem on the manufactured article and 65 cents special on the rough, should be increased to as nearly a prohibitive standard as possible, rather then reduced 20 per cent. as the pro-Italian Mills bill proposes.

HUGH MILLER.

PERHAPS the life of no one who has been intimately connected with geology presents so much of interest to the general reader, as well as those more directly interested in stone, as that of Hugh Miller. He was one who through intelligence and force of character brought himself from the position of a laborer in a quarry to that of one of the most eminent of modern geologists, one whose opinion was highly esteemed on other topics than that to which he devoted most of his time, a man of broad general information as well as one who had special knowledge of a high order.

Hugh Miller was born in Cromarty, Scotland. His father as well as his grandfather and great-grandfather were seafaring people. His father during his life was a man of considerable means for one in his position. When his son was three years old, his ship, which comprised his wealth, foundered and was lost at sea carrying him down with it. His mother sent him to the school ot his native town where he bore the reputation of being a dunce and a truant. The fields and woods, the sea and rocks afforded him his one enjoyment and most of his time was spent studying nature. He left school with a knowledge of reading, writing and a little arithmetic, and with the credit of a great memory and little scholarship.

In 1821 he started out to make his living. His own words will best describe the beginning of this life. "I was but a slim, loose-jointed boy at the time, fond of the pretty intangibilities of romance, and dreaming when broad awake; and woeful change. I was now going to work at what Burns has instanced in his 'Twa Dogs' as one of the most disagreeable of all employments—to work in a quarry. Barring the passing uneasiness occasioned by a few gloomy anticipations the portion of my life which had already gone by had been happy beyond the common lot. I had been a wanderer among rocks and woods; a reader of curious books when I could get them; a gleaner of old traditionary stories; and now I was going to exchange all my day dreams, and all my amusements, for the kind of life in which men toil every day that they may be enabled to eat, and eat every day that they may be enabled to toil."

In the quarry in which he was at work a large mass of debris had to be cleared away by the use of gunpowder, to him a new and amusing process. The gunpowder loosened a mass of one of the inferior strata and when it was placed on edge for removal, the appearance of the platform on which it lay attracted the attention of the observant boy. He says: "The entire surface was ridged and furrowed like a bank ot sand that had been left by the tide an hour before. I could trace every bend and curvature; every cross-hollow and counter-ridge of the corresponding phenomena; for the resemblance was no chance resemblance. It was the thing itself; and I had observed it a hundred and a hundred times when sailing my little schooner in the shallows left by the ebb, but what had become of the waves that had thus fretted the solid rock, or of what element had they been composed? I was as completely at fault as Robinson Crusoe on discovering the print of the man's foot in the sand." The same day he observes that the stones which were found on the diluvium above the quarry were of a different character from the sandstone of the quarry, differed from each other, and that they were all water worn as if they had been tossed around in the bed of the sea for hundreds of years. On the raising of a second block he saw a depression of circular form in the stratum below which presented the same appearance as a pool does when the water has dried from it and the sun has cracked the mud in every direction. All this was the result of the observation of his second day's work. The reason for these phenomena he did not discover for some time. Geological books were rare in 1821 and utterly unattainable to a poor boy working in a quarry. But the observation which he brought to bear on his first day in the quarry served him all through his life, and by dint of asking questions, examining everything which came in his way and spending much time thinking about the things he saw, he at last began to see the reasons for the phenomena in the rocks around him and his after work was comparatively easy.

After working a short time in the first quarry it was abandoned as being unprofitable, and he went to work in another on the bay of Cromarty. He says: "Not the united labors of a thousand men for a thousand years could have furnished a better section of the geology of the district than this range of cliffs." At the end of his first year's experience in the quarry he says: "The amount of my happiness had not been less than in the last of my boyhood. My knowledge had increased, too, in more than the ratio of former seasons. The additional experience of twenty years has not shown me that there is any necessary connection between a life of toil and a life of wretchedness."

There is not space to follow out Mr. Miller's experiences in the quarry. He was first in one district then in another, always with his eyes open, his curiosity fresh and his judgement ripening. These very qualities, together with industry, are what made him a different man from those who worked around him during his first days' labor.

He passed fifteen years as a stone-cutter at the end of which time a bank was established in his native town and he was appointed to the position of accountant, one which he held for five years. During this time he was busy studying and at times writing. A letter which he sent Lord Broughham on a question relating to a church problem which was agitating the country at that time attracted much attention, and when the free church established an organ called *The Witness* he was made its editor. The success which this newspaper attained is due almost entirely to the articles on political, ecclesiastical and geological subjects which Mr. Miller wrote for it.

The rock in which Mr. Miller worked, that which abounds in and about his native town, is the old red sandstone. It includes several formations which occur in what is known as the Devonian period and covers this whole period with the exception of two or three formations directly following the Silurian. It had long been believed that in this red sandstone there was a lack of fossils, and it was only after working in it for several years that Mr. Miller discovered that it was not only richly fossiliferous but, as he expresses it, it could supply fossils by the ton to all of the museums of the world. He discovered forms of life which were entirely unknown to scientists and which, when first presented by him, were considered as inventions. It was only after ten years' work in geology that he received any assistance from the outside. Then his discoveries began to attract attention and he at first, through correspondence and afterwards through conversations, compared his work with that of eminent scientists of whom Cuvier and Aggassiz are notable examples, and his work from that time was carried on with more ease if not greater pleasure.

The history of his discoveries cannot be presented here in even the shortest form. His own presentation of them fills volumes and it is to them that we direct the reader. His books are notable not alone for the value of his remarkable work but as well from the elegance and purity of his style, the clearness of his descriptions and general soundness of his deductions. His most celebrated book is "The Old Red Sandstone." Not less attractive and valuable is "Footprints of the Creator," "Testimony of the Rocks," "Popular Geology." These bear directly on geology. There are others of which his "Essays" and "First Impressions of England" are notable examples, which while they are not particularly geological in character, are not of less value to one interested in that study than to the general reader.

To fully appreciate Mr. Miller's work, one must in some degree understand the condition of geology at the time when he began his labors. In 1820 this science was in its infancy even in the old world. It was encumbered with fanciful theories of the German school which was represented by Werner. The fact that each formation had its peculiar fossils which distinguished it the world over and which marked it as different from any other formation was not then recognized. It was during Mr. Miller's life that geology assumed form as a distinct science and few men had more to do with its developement than he.

"There are few professions, however humble, which do not present their peculiar advantages of observation; there are none, I repeat, in which the exercise of the faculties does not lead to enjoyment. I advise the stonemason, for instance, to acquaint himself with geology. Much of his time must be spent among the rocks and quarries of widely separated localities. The bridge or harbor is no sooner completed in one district, than he has to remove to where the gentleman's seat, or farm steading is to be erected in another; and so in the course of a few years, he may pass over the whole geological scale; and this, too, with opportunities of observation, at every stage, which can be shared with him by only the gentleman of fortune, who devotes his whole time to the study. Nay, in some respects his advantages are superior to those of the amateur himself. The latter must often pronounce a strata unfossiliferous when, after the examination of at most a few days, he discovers in it nothing organic; and it will be found that half the mistakes of geologists have arisen from the conclusions thus hastily formed. But the workingman, whose employments have to be carried on in the same formation for months, prehaps years together, enjoys better opportunities for arriving at just conclusions. There are besides, a thousand varieties of accident which lead to discovery, and the man who applies his labor at all seasons in the air has by much the best chance of profiting by these. There are formations which yield their organisms slowly to the discoverer, and the proofs which establish their place more tardily still. I was acquainted with the old red sandstone of Ross and Cromarty for nearly ten years ere I had ascertained that it is richly fossiliferous—a discovery which in exploring this formation in these localities, some of our first geologists had failed to anticipate. I was acquainted with it for nearly ten years more ere I could assign to its fossils their exact place in the scale.

"My advice to young workingmen, desirous of bettering their circumstances and adding to the amount of their enjoyment, is a very simple one. Do not seek happiness in what is misnamed pleasure; seek it rather in what is termed study. Keep your consciences clear, your curiosity fresh, and embrace every opportunity of cultivating your minds. Learn to make a right use of your eyes; the commonest things are worth looking at, even stones and weeds and the most familiar animals. Read good books. You are jealous of the upper classes, and perhaps it is true that you have received much evil at their hands; but there is only one way in which your jealousy of them can be well directed. Do not let them get ahead of you in intelligence. Society, is in a state of continual flux; some of the upper classes are from time to time going down, and some of you are from time to time mounting up to take their places, always the more steady and intelligent among you remember; and if all your minds were cultivated, not merely intellectually but morally also, you would find yourselves as a body in possession of a power which every charter in the world could not confer upon you and which all the tyranny or injustice of the world could not withstand."

COMPOSITION OF MARBLE.

As is well known marble is a limestone which has been changed by the action of heat and pressure to its present form. The limestone has become crystalline in structure. The color of the marble is decided by the character of the limestone from which it was made and from the degree of heat to which it was subjected. For instance, many of the purest limestones become grey or black marble from the carbonaceous remains of the shell bed. In places where this stone was subjected to a greater degree of heat the carbon was burned out and the marble is white; just as white lime is made by burning dark limestone. Again white marble is the result of heat on a pure limestone, one which contained no animal remains.

It is not easy to draw the line between a marble and a limestone. Webster's definition of marble is "a fine limestone, fitted, either polished or otherwise, for ornamental uses." Much limestone of undoubted character figures commercially as marble.

Prof. Ezra Brainard says: "The best marble results from a happy combination of many circumstances. A limestone may fail to attain the rank of a marble for one or more of the following reasons:

"1. It may contain impurities which impart a dull or earthy color. The range of allowable color is wide; but it must be bright and agreeable to the eye.

"2. It may contain minerals that are much harder or softer than the lime carbonate. Siliceous, or slaty matter, is found in most of the lime rock, rendering it difficult to cut and polish. Occasionally great beauty of color may compensate for this, as in the case of the Winooski marble, which is quite siliceous.

"3. The coarseness of the texture may prevent a pure and beautiful limestone from ranking as an ornamental marble. This is generally the case with the deposits now profitably wrought in Berkshire and Litchfield counties, Massachusetts and Connecticut, for architectural purposes. On the other hand, from a lack of crystalline structure the stone may not be susceptible to a good polish. Rutland and Addison counties, Vermont, are the region where the crystalline structure is about the right mean.

"4. The unsoundness of a rock may be a great practical objection. A jointed structure, or the presence of minute fractures, or a tendency to fracture, is a frequent cause of failure.

"5. Lastly, a stone otherwise excellent, may fail in durability on exposure to the weather, and so be unsuitable for many of the uses to which ornamental marble is put. The crystals which compose it are sometimes but feebly cemented together and the stone crumbles or furnishes an easy foothold for lichens. Many impurities not otherwise objectionable, dissolve away after awhile, leaving a stain, or existing as separate crystals, become detached leaving a cavity, or sometimes the lime carbonate itself dissolves away faster than the impurities and the stone 'weathers' to a dull or dingy color."

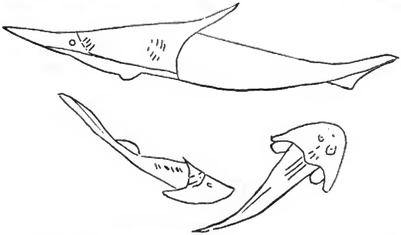
MACHINE-MADE MORTAR.

An idea has been developed in Germany in the shape of the manufacture of mortar by machinery in large quantities, to be delivered to contractors or individuals as required for use. About 2,000,000 barrels were disposed of in Berlin on this plan alone since last year.

ROCK HISTORY NO. II.

FOLLOWING the Silurian age comes the Devonian. This formation was named from Devonshire, England, where it was first studied and located in 1837. Perhaps the best opportunities for observing these rocks is in our own country, particularly in that part bounded on the north by the great lakes and extending south to the Ohio and Tennessee rivers and east in some places to the ocean. They have been the most extensively studied in Scotland by Hugh Miller, he having devoted his life to that part of the Devonian system which is exposed in Scotland and neighboring islands. The exposure there is known as the old red sandstone and corresponds to the upper layers of the Devonian known in this country as the Catskill group.

The Devonian rocks are distinguished, as are all other systems, by the fossils which they contain. The most prominent fossils of this system are fishes of various kinds and sizes. Fishes are first found in the upper Silurian rocks, but not to any great extent and not sufficiently developed to be considered as typical Silurian fossils. It is in the Devonian age that they attain their greatest size and are most numerous. The fishes of that period differ greatly from those of to-day. They were covered, some of them entirely, and some only partially, not with the scales which we see on our fishes, but with an armor of bony scales.



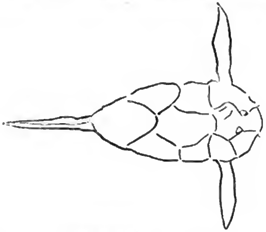
DEVONIAN FISHES.

Hugh Miller's description of one of them will best serve to illustrate their condition in this respect. He says: "A creature with its skull as naked as its teeth, the bone being merely covered, as in these, with a hard, shining enamel, and with toes of hard enameled bone, would be deemed an anomaly in creation. And yet such was the condition of the *osteolepis*, and many of its contemporaries. The enameled teeth were placed in jaws which presented outside a surface as naked and finely enameled as their own. The entire head was covered with enameled osseous plates, furnished inside like other bones, as shown by their cellular construction, with their nourishing blood vessels and perhaps their oil, and which rested apparently on the cartilaginous box, which must have inclosed the brain, and connected it with the vertebral column. I cannot better illustrate the condition of the fins of this ictholyte than by the webbed foot of a water fowl. The web or membrane of all aquatic birds with which we are acquainted not only connects but covers their toes. Imagine, however, a webbed foot in which the toes, connected, but not covered; present, as in skeletons, an upper and under surface of naked bone; and a very correct idea will be formed from such a foot, of the condition of a fin which obtained among at least one half the ichtolytes (fishes) of the lower old red sandstone. In this singular class of fishes all was bone without, and all was cartilage within; and the bones in every instance, whether in the form of jaws or plates, of scales or of rays, presents an external surface of enamel."

Another peculiarity of Devonian fishes was their teeth. They show that all these fishes were prepared to fight for their lives. A specimen found in this country shows that this fish had jaws eighteen inches long and teeth two inches or more in length. Another shows jaws twenty-two inches long while the animal was eighteen feet long. LeConte says: "Probably never in the history of the earth have fish existed in greater numbers, variety and size; and certainly they never have been more thoroughly armed for offense and defense."

The range of size of these fishes was from ordinary fishes of to-day to those eighteen to twenty feet long. In shape they were the most various. There were those which show their relation to the fish of the present day, and must have been beautiful in form as well as large in size. There are others which bear no resemblance to fishes of this age and which have only been recognized as such after long study and comparison of their characteristics.

We present a cut of a *pterichthys* found by Hugh Miller in Scotland. It was recognized as a fish by Agassiz. As will be seen it was covered with large bony plates instead of bony scales. The tail is vertebrated. The other cuts present fishes which bear a greater resemblance to those of the present time. We still have a few fishes with a cartilaginous skeleton, as the sturgeon. As said before those of the Devonian age were exclusively cartilaginous. None with bony skeletons were known. These were a more recent developement.



PTERICHTHYS.

In fishes we have a higher organization than had been known before. In the crustacean, the highest order previously known, the nervous system was simply a knotted cord. In fishes we have a nervous system which centers in the brain, with a spinal cord inclosed in a vertebrated column. This was a great advance toward a higher organization.

The crustaceans, notably the trilobite which ruled the seas in the Silurian age, still existed, but much less numerous and of a greatly reduced size. From this on they gradually disappear. We find corals as before but some of the species have ceased to exist and new ones are found. A peculiar phenomena is observed in regard to these Devonian corals in the falls of the Ohio River near Louisville. Here the softer parts of the calcareous rocks have been washed away and the harder corals stand up above the surface with erect stems sending out branches just as though they were alive. Brachiopods (shell-fish) are found in the Devonian but they are different in form from those of the Silurian age, and are readily distinguished through this difference.

It is probably true that for the first time in the history of the earth there was in the Devonian age a true forest vegetation. We find fossils which show that land plants grew in considerable numbers and attained a great size. Of these, ferns were the most important, in this as in the succeeding age. Club mosses grew to immenees size attaining the height of trees. A tree allied to our yew grew to great size. Fifty orders of Devonian land plants have been found in Nova Scotia alone. There is no evidence of land animals and sea vegetation abounded as in the Silurian age.

The land which was in this country raised above the ocean at the end of the Devonian age was considerable, though developement was not as great as at the end of the Silurian age. As said before, it is found throughout Western New York westward to the Great Lakes, south to the Tennessee River. There is a band of Devonian rock found west of the Mississippi River and the area is broken in Indiana by a large deposit of Silurian rock and in Michigan by the carboniferous system.

SOUTHERN GRANITE.

THE South with its many natural resources is none the less rich in stone than in many other respects. Iron, coal and petroleum are well known as belonging to that section. The fame of Birmingham, Northern Alabama and Southern Tennessee, has gone all over the world as a most wonderful iron-producing region. The marble of Tennessee and the granite and marble of Georgia are well known. Each year adds to the known excellence of these products. Altogether the evidence of richness in these states is encouraging indeed. The knowledge of the resources of this section is doing more to set aside the effect of the contentious and ill-mannered backbiting which has existed among the politicians of the North and South during recent years than anything which we have in mind. Herewith we submit extracts from a circular of the Southern Granite Co., of Atlanta, Ga. We make these extracts without solicitation and merely for the purpose of indicating to the country at large the quality of one of the products of our Southern States. Samples were submitted by this company to the Government with the following result:

ORDNANCE OFFICE,
WASHINGTON NAVY YARD,
January 7, 1887.

Respectfully returned.

The within-mentioned cubes (2″ by 2″ by 2″) of granite have been tested, with results as follows;

FROM RICHMOND, VA.

No. 1. Sample crushed at 68,000 lbs.
No. 2. Sample crushed at 70,260 lbs

FROM LITHONIA, GA.

No. 1. Sample stood a crushing strain of 85,000 lbs. (capacity of machine) without cracking. Very small pieces broke off one corner.

W. SWIFT,
Lieutenant U. S. N., Assistant Inspector of Ordnance in charge.

I certify that the above is a true copy.

THAD. K. S ,
Chief Clerk Bureau of Ordnance.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY,

Hon. J. W. Powell, Director:

SIR:—I have examined the samples of Lithonia, Georgia, granite referred to me from the Central office. The only test of any value which could be properly applied here, was a test of the capacity of sample for absorbing water; or in other words, a test of porosity. The sample, after drying in an oven, was weighed. One face was then immersed in water, and left for 48 hours. After that the sample was wiped, allowed to dry at the ordinary temperature of the air for 24 hours, to remove surface dampness, and again weighed. The results were as follows:

	WEIGHT BEFORE SOAKING. Grammes.	WEIGHT AFTER. Grammes.
Lithonia Granite,	381.5	381.7

It will be seen that the pair of weights are sensibly identical; that is, practically no considerable amount of water has been taken up, and the stone is therefore not appreciably porous. The probability deducible from these observations is that the stones would well withstand the disintegrating action of frost. Respectfully, F. W. CLARKE,
Chief Chemist.

DEPARTMENT OF THE INTERIOR,
UNITED STATES GEOLOGICAL SURVEY.

Mr. William Hussey, Washington, D. C.:

DEAR SIR:—Concerning the building stones, samples of which you recently submitted for examination, I have the honor to report as follows:

A thin section of the rock from each locality has been made and examined under the microscope. The specimens are all normal granites, in which, besides quartz, there are two kinds of mica (Muscovite and Biotite) present, with much feldspar. Most of the feldspar is microcline, some orthoclase and plagioclase; but all are in a fresh condition, indicating that the rock has been subject to but little alteration. The microscopic examination revealed nothing the presence of which would be likely to cause the granite to rapidly disintegrate upon exposure, or give rise to ferruginous stains to disfigure the weathered surface.

I desire to obtain chips of the same blocks of granite from which the small cubes were cut, so as to be able to discover the effects of pressure upon the rock constituents.

Very respectfully your obedient servant, J. W. POWELL,
Director.

WASHINGTON, NAVY YARD, March 5th, 1887.

Report of Test of Specimens of Stone presented by H. J. Stanley, Chief Engineer Board of Public Affairs, Cincinnati, Ohio.

Date.	Marks.	Dimensions.—in inches.	Crushed at lbs.	Remarks.
1887 Feb. 25.	Richmond, Std.	2 .03 x 2 .02x2 .01	83,900	X
"	Lithonia, Ga.	2 x 2 x2 .03	76,800	O—
"	Richmond, Std.	2 .03 x 2 .05x2 .05	78,000	X
"	Lithonia, Ga.	2 x 2 01x2	83 400	O—
"	Richmond, Std.	2 .01 x 2 .01x2 .01	69,000	X Spec'n uneven. The upper and lower surface not parallel by ".07.
"	Lithonia, (No. 3) Ga.	2 .06 x 2 .06x2 .09	52,650	
"	Richmond, Std.	2 .03 x 2 .01x2 .01	68,273	X
"	Lithonia, Ga	2 01 x 2 .01x2 .01		O—Did not crush at 85,000 lbs.
"	Marlboro, N. H	1 .98 x 2 x1 .98	70,100	
"	Stone Mt.	2 .05 x 2 x2 .01		Did not crush at 85,000 lbs
Feb. 26.	Lithonia, Ga.	2 x 2 .98x1 .98		O—Did not crush at 85,000 lbs.
"	Stone Mt. Ga.	1 .99 x 1 .99x2 .00	50,325	
"	Stone Mt. Ga.	1 .99 x 1 .99x2 .00	45,730	
"	Stone Mt. Ga.	2 .02 x 2 .02x2 .03	65,610	
"	Marlboro, N. H.	2 .02 x 2 .01x2 .04	61,940	

I certify that this is a true copy.

(Signed) THAD. K. SAILER, Chief Clerk.

A LOST ART.

Some arts of former ages have been lost, as that of engraving on crystal stones and granite, practiced by the Ethiopians, Egyptians etc., and the art of painting on glass, practiced in the monkish ages. Different directions, too, have been given to the arts, though each is perfect in its way. Chinese art, Japanese art, Hindoo art, are each different from European, which follows the Greek standard in sculpture and the Italian in painting.

We furnish in this number, in a print of the catalogue of the Jesup collection of building stones, in place in the American Museum of Natural History, New York City, something of exceeding great value to everyone interested in the stone trade. It has cost us quite a sum of money to do this, but it is a convincing evidence that STONE has a mission, and knows very well how to fulfill it. Now is the time to subscribe.

A poor emaciated Irishman, having in a forlorn hope called in a physician, the latter spread a large mustard plaster and put it on the poor fellow's lean chest. Pat, when he with tearful eyes looked down on the plaster, said, "Docther, it strikes me it's a dale of mustard for so little mate."

VERMONT MONUMENTS AT GETTYSBURG.

In the Battle of Gettysburg the little state of Vermont was represented by two brigades, one regiment of cavalry and three companies of sharpshooters.

Two years ago the Legislature appropriated $6,560 for monuments on the field and $2,500 for expenses and securing sites, building roads, etc. The fund has been increased by private contributions of $4,118.50 and the present Legislature has appropriated $8,000 more, to complete the work, making the total cost, including the payment of $1,500 to the Battlefield Memorial Association, $21,143.50.

An able commission, consisting of the Governor and one representative of each organization, most of whom are prominent men in civil life, is expending this money in a manner that will reflect the highest credit upon the State.

Instead of building a monument to each regiment and separate company, they decided to build one for the State, upon which all the troops Vermont had upon the field will be commemorated, to stand where Stannard's Brigade made its famous flank movements upon Pickett and then upon Willcox. They will also have four smaller monuments to mark the positions of the other detachments.

In this issue of STONE all these monuments, except the one to the First Vermont Cavalry, which is not yet ready, are illustrated and described. It will be seen that they represent some of the best art upon the field. The State Monument, in particular, is pure Greek, being almost an exact copy of the column to Lord Nelson, in Trafalgar Square, London.

All the cultivated nations have one or more Corinthian columns of similar design. They stand the test of art and time better, perhaps, than any others, and in their chaste simplicity they stand in marked and creditable contrast from many studies in monumental architecture which, after the impression of novelty has worn away, leave only a painful conviction that somebody was straining after a novel effect.

The Vermonters have happily avoided this danger and are producing a monument which will not only command the admiration of every cultivated person, but will be one of the most conspicuous objects upon the field, standing in the open and most visited portion and being several feet higher than any yet erected.

It is to be surmounted by a bronze statue of the late Major General George J. Stannard, and the drawing here shown is said to be a very good representation of him as he appeared in the battle while directing the great and decisive movement of his brigade in the supreme crisis of the third day. But the statue has not yet been modeled, and indeed the Commission is not committed to this design. This was made more for the purpose of showing the monument complete than to indicate exactly how the statue may look. It is said that some will prefer the statue to represent Stannard with his right sleeve empty, as he appeared later in the war, and some may prefer a statue in repose to one in action, but it must be conceded that this one is very expressive, and as it was drawn by Charles W. Reed, the noted delineator of Boston, artists will at least have to think twice before they can improve upon it.

This monument is being built by the Carrick Brothers Granite Company, of St. Johnsbury, Vt., of granite from George E. Lyon's quarry at Dummerston, in the same state. All the monument except the die is very light in color. The die is darker and polished, except the coat of arms, which is in bas relief. The inscriptions are all V-sunk. The dimensions of this monument are as follows:

First base,	17' x 17' x 1' 9".
Second base,	12' 6" x 12' 6" x 1' 3".
Third base,	9' 7" x 9' 7" x 1' 4".
Plinth,	7' 9" x 7' 9" x 3'.
Die,	6' x 6' x 6', (possibly a little taller).
Die at top,	5' 9" x 5' 9".
Cap,	7' 9" x 7' 9" x 2' 4".
Second Cap,	5' 5" x 5' 5" x 1' 9".
Spire,	3' 7" x 3' 7" x 20'.
Spire at top,	3' 2" x 3' 2".
Spire Eutasis in center	
Capital,	4' 9" x 4' 9" x 3' 10".

The weight, exclusive of the statue, is computed at 140 tons.

The First Vermont Brigade did not happen to get thrown into action, but it has a record of twenty-seven battles and no other brigade in the Union army was more distinguished. In their report to the Governor, the Commissioners say:

> "In devising a monument to mark the position held by the First Brigade, an effort was made to find something suggestive of the character of that famous organization, and of the important though quiet service which it there rendered. It was expected that during the third day of the battle the enemy would attempt to turn the left flank of the Union army by circumventing Round Top. This brigade was stationed east of the hill at a point where it could best meet the assault or whence it could soonest be moved to strengthen some other part of the line. Thus the enemy would have found "a lion in his path" had he made the anticipated movement. This thought suggested the design herewith shown. The lion was drawn by Mr. C. W. Reed of Boston, one of the most noted figure artists in America, and, as will be seen, it tells the whole story. The lion is facing south, whence the attack was expected. To his right and rear he hears the roar of the conflict preceding and during Pickett's charge, and is ready to spring to that point if necessary. The figure, when executed in the lightest of Vermont granite and erected upon an inscribed pedestal, at the highest point on Sedgwick Avenue, will be one of the most attractive works of art upon the field."

The monument to Company F., First U. S. Sharpshooters, is built of white Rutland marble, the Battlefield Memorial Association having made an exception in favor of this durable stone to its rule against the erection of any but granite or bronze monuments. The troops which it commemorates were the first to meet the Confederate advance, half a mile west of the Peach Orchard, on the second day of the battle. The monument will stand just west of the oak grove in which Pickett's column formed the next day. It differs from most of the other sharpshooter monuments upon the field, in that it does not attempt to show the figure of a soldier. The eagle perched upon its summit, however, shows considerable fight, and this, by the way, is a very clever design for an eagle to be cut in stone.

It was reported by some Confederate officer that when their assaulting column approached the Devil's Den from the west, on the afternoon of the second day, it "encountered a hornets' nest of sharpshooters, extending all the way from the Wheat Field to the Slyder meadow." This was the United States Second Regiment, of which the commander, Col. Homer R. Stoughton, and Companies E and H, were from Vermont. By the roadside near the Slyder house their memorial will stand. It will be a monolith of rough granite, finished upon the face and showing the Vermont coat of arms, the Sharp's and target rifles used by the sharpshooters and a hornets' nest, as will be seen by the cut, and like the other Vermont monuments, it will be altogether unique upon that field.

The monument of the First Vermont Cavalry has not yet been provided for except in the division of the appropriation. A design has been substantially agreed upon, consisting of a massive granite tablet, upon bases, with a bronze panel in the tablet, representing a cavalryman charging.

These monuments will not be dedicated until sometime next year.

As above stated, the Carrick Brothers Granite Company of St.

Johnsbury have the contract for the State monument and they also have the contract for the First Brigade monument (the lion) and they become liberal contributors towards the cost of that, on account of the desire of one of their number to suitably commemorate the brigade in which he served.

The marble monument to Company F, First Sharpshooters, is being built by the Ripley Sons, of Rutland, and one of them, Gen. Wm. Y. W. Ripley, gives $700 towards it, on account of doing a good thing for his old command.

The contracts for the other sharpshooter monument and for the cavalry monument are not let.

THE CHURCH TOWER THAT FELL.

THE falling of the church tower in Washington City was mentioned in last month's STONE. In the meantime there has been an inquiry instituted by competent authorities who make a report which shows a thorough acquaintance with the subject, and which contains an impartial review of facts. The *Building Record* says of this report:

> Accepting this report, therefore, as a correct statement of the case, it appears that there was no indication that the foundation yielded, and that in form and dimensions the design of the tower would have given "a thoroughly substantial and permanent structure," "the computations of strength, pressures and thrusts were carefully and intelligently made by the architects and the assumptions upon which they were based correct," except in the opinion of the commission, as to the strength of mortars for rubble masonry. It is also stated that the tower and even the foundation walls though rather small in proportion "could have been built of the given dimensions with great security even in rubble work by using the requisite materials and workmanship," and though the plans and specifications are criticised as not being sufficiently explicit as to what constituted the "first-class" work that they called for, it is added that even under the specifications as they stood the tower would not have fallen.
>
> Why then did it fall? The commission answer: "The deplorable results were due in a great measure to an entire absence of any continuous personal direction, supervision or inspection by the architects or their representatives." This answer, however, does not fully meet the case, it only shifts the question further back, and the inquiry now is. Why did not the architects furnish this continuous superintendence?
>
> The reason would appear to be because the architects were willing to jeopardize their reputation, as reputable architects are doing every day when they furnish plans and specifications to clients in distant cities without having a clerk of the works or a superintendent constantly on the ground simply because their clients will not pay for it, but undertake to furnish such superintendence as they deem necessary, only sending for the architect occasionally or when too late to avert disaster.
>
> This way of doing work is similar to that in hundreds of other cases throughout the country. Why structures so neglected do not oftener fall is a problem we cannot explain.

There is a good deal of talk about what the architects should do, and that they should refuse to do work if matters are not put altogether in their own hands. Suggestions are made that a clerk of works should be appointed who should spend all his time in the inspection of important buildings. This is all well enough and would probably lead to good results, but we must be reasonable about matters of this kind, or rather we must consider the unreasonable qualities of people with whom we have to do business. Take a case which would illustrate our point. An architect is invited to meet a building committee and his price is asked. He gives it, and there is often more or less of an effort on the part of the committee to make a close deal. The architect may or may not suggest that a regular superintendent should be appointed. That makes no particular difference. Any building committee may know that a pier may be built in Washington and the architect in New York not be able to see entirely through it at that distance. The architect is occasionally called upon to visit the work or comes at various intervals. Who is responsible for making a contract of this kind? Certainly not the architect. Any one who stops to think about it knows that his preference would be for a superintendent constantly on the work. In the present case it has been resolved to reconstruct this tower, and no changes will be made in the plan. Undoubtedly a superintendent will be appointed and it will be properly built and will stand as all church towers should. An architect is like anybody else. All this talk about the regard for the profession and the regard for professional reputation is mere bosh, it is a matter of business. An architect will make the best deal he can. If a good contract is in sight, one that promises a fair return, he will take it with or without a clerk of the works. None of the architectural journals are talking about re-arranging the schedule of the architectural associations so that a clerk of the works in America would be a regular thing. It would be all right and proper for the architects associations to do this. But the people will have something to say in the matter. The *Building Record* has this to say along that line.

> If an architect agrees to supervise the erection his commission should be sufficient to cover all the expenses incident thereto. This will, of course, require an increased commission for out-of-town work, but on just what scale is a matter for the Institute to decide.
>
> If the building that the architect has agreed to superintend is of sufficient importance to require a clerk of the works, as this building certainly was, he should be appointed by and be under the sole direction of the architect. In this way only can the responsibility for superintendence be definitely fixed and its proper performance secured.
>
> While, however, these matters should, and doubtless will, receive the early attention of the Institute, the architects can meantime do much individually to improve the existing practice.

The people have been used to paying five per cent. and less to architects for their services and a readjustment of the schedule in a way to require a clerk of the works will not be accepted at once by the people who will have something to do with this sort of thing, and the architect who stands out as a reformer, determining to exact everything required by the schedule, will find himself in a very uncomfortable situation. It will take the falling of a good many church towers and other buildings to bring about a general willingness on the part of the people to employ a clerk of the works. This matter is no fault of the architects. They do the best that their business instincts will allow. Occasionally a building falls because the plans are not properly carried out. If the remedy is held up before the people in a quiet kind of a way and without the disposition to force a whole clerk of the works down the public they will in time accept him as a necessity. But they will not be in any hurry about it. Buildings don't fall often enough to precipitate this change rapidly. They think about it for a time and then there is a relapse. It is a good deal like the car heater. We hear most of it after a hard winter when there have been a good many accidents and a good many people burned to death. About the time that public opinion is pretty well worked up on the subject, spring makes its appearance, the fires in the car heaters go out and the people are not burned to death. Then we forget about the car heater until the next winter. In time it will come around all right.

Firing is only done properly when the fuel is consumed in the best possible way,—that is, when no more is burned than is necessary to produce the amount of steam required, and to keep the pressure uniform. To attain this end, complete combustion must be obtained in the furnace, and this is going on when the fuel is burning with a bright flame evenly all over the grate. Blue flames, dark spots and smoke are evidences of incomplete combustion, due to like of air

CORRESPONDENCE.

CORRESPOND WITH US!

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

Marble and the Tariff.

To the Editor of Stone.

SIR: STONE travels far, and here in England we have read the article under this heading which appeared in your October number. The argument is ingenious but will not stand criticism. You take the duty and freight paid upon an imported marble monument, the agent's commission and cost of stock. You deduct these items from the contract price and the balance you say is that which the Italian workman gets. From this you draw the moral that if the States had free-trade your workers would be badly off. Let as look further into this. The price of the monument delivered to New York was $105.00. Good. And the freight and duty was $48.00. This was paid by the consignee who remitted the balance of $57.00 to the importing agent. The agent charged a commission of 20 per cent. on $105.00. But why? If he did not pay freight or duty why should he claim a commission on those items? We take it that the commission should be on $57.00 and not on $105.00. This would bring the commission item down to $11.40. You set the cost of stock at the quarries at $2 per cubic foot, but this is about twice the cost of the stock used for monuments of this description. Instead, therefore, of this item figuring for $22.67 it should be $11.34. Now let us compare figures. You make your sum as follows:

Price delivered in New York		$105.00
Duty and freight to New York	$48.00	
Agent's Commission	21.00	
Cost of stock at quarry	22.67	
		91.67
Leaving for Italian worker		$13.33

We make our calculation come out:

Price delivered to New York		$105.00
Duty and freight to New York	$48.00	
Agent's Commission	11.40	
Cost of Stock	11.34	
		70.74
Leaving for Italian worker		$31.26

According to your statement work of a similar character would be paid for in your country at a rate which would bring labor cost to $66.47. That may be, but if your workingmen have to pay more for every ounce of clothing which they wear; if they have to pay bigger rents; if, to put it shortly, it costs more to live with you than in the Old World, we fail to see where the workingman gets his pull.

Put it in another way: England is a free-trade country. Our workingmen have to compete with the labor of the world. They do so by cutting and contriving and by a continual improvement of mechanical appliances. What follows? Take our own case. Some years ago we manufactured a great deal of monumental work in Italy. Now we do most of it in this country, quite as cheaply and of very far better quality. Our men get good wages and live cheaply, but to enable them to do so we are continually improving our mechanical appliances. We are importing rough marble into England working it here and re-exporting it to better advantage than by working it in Italy. We therefore find labor for Englishmen which was done by Italians. On the other side we hear of American firms who set up factories in Italy and employ Italian laborers for work which was once done by Americans. This is the only way in which they can retain a vestige of export trade. We leave it to you to say which course brings most labor to a country. Looking at the matter selfishly Englishmen may sincerely trust that the day may be long distant before the people of your country adopt free-trade.

When that time comes we fear that your ingenuity will make us know what competition really is in those neutral markets of the world which now you cannot touch. We are yours, obediently,

ARTHUR LEE & BROS.

Bristol, England, Oct. 19.

American Portland Cement.

To the Editor of Stone.

DEAR SIR: I notice an article in STONE, on the manufacture of Portland cement in this country and would like to give you a description of my patent process in the manufacture of Portland cement and the result obtained from cement made under my supervision and I think you will agree with me that American Portland cement is far superior to any of the imported brands. If you think proper to use the following facts relative to the manufacture of Portland cement you are at liberty to do so. The process of manufacture of Portland cement by Gostling's improved chamber kiln and reducing mill or method is being adopted by the Catasauqua Cement Co., Catasauqua, Pa., and will shortly be adopted by the National Cement Co., Wampum, Pa. From the description which I will give you will readily see the great advantage my process has over all others inasmuch that the exhaust or waste heat is utilized to dry the composition previously to being burnt in the kilns, all other or any other methods do not utilize the heat from the kilns but allows it to go off in the air. The United States Government has granted me letters patent on my two methods.

Gostling's method is then to construct a kiln, attached to which is a chamber of sufficient size to contain enough composition when dried by the waste heat to refill the kiln and the heat from the kiln is drawn over the mass (or slurry as it is termed) by a draught created by a stack at end of chamber, which can be made to suit capacity of kiln. The amount of gas expelled from the burning cement in kiln is about 43 per cent. so that one can readily understand the enormous drying capacity of such waste passing over the composition. In all other methods in the manufacture of cement there is a considerable amount of manual labor attached to getting the composition into the kiln from the mixing machines, but under my process the whole thing is done by machinery until it reaches the dried state before going into kiln, consequently a great saving is effected in doing away with manual labor, and furthermore the result obtained from my chamber, kiln and grinding process is superior to all others as the quantity of cement clinker given by each kiln is its full capacity and which is not the case in other methods. The tests I get from my cement will exceed most of the imported cement by 100 pounds on the one-inch section at the same age and in many cases as 200 pounds on the same section. I state this to show you the fact that American Portland cement can hold its own against the known world. Trusting these few remarks on cement will be appreciated. I am, dear sir, yours very respectfully,

C. R. GOSTLING, Supt. National Cement Co.

Pittsburgh, Pa., Oct. 8.

A Nebraska Association.

To the Editor of Stone.

SIR: Inclosed please find order for STONE, also a copy of a call for a convention of marble and granite dealers of Nebraska. I hope our efforts will not be in vain, and that after our meeting we will be able to furnish an encouraging report (if not a funeral notice at the start), as it is difficult to foresee what the result will be in an undertaking of this kind. We can try however, and in case nothing is accomplished, it may do no harm, unless it be a cursing from the opposition who may try to divert attention from the movement by the cry, of "Combination," "Ring," "Pool" etc. We shall, however, make an honest effort to succeed, and hope for good success. Yours very truly, CHAS. NIEDHART.

Brownville, Neb., Oct. 22.

Perhaps He Has a Bonanza.

To the Editor of Stone.

SIR: At request of Ingersoll Rock Drill Co., New York (with whom I have been negotiating for some machinery.) I ship you to-day by express a specimen of stone, from five feet of surface.

This stone is from near the surface, very easily quarried in any sizes desired, varying as the stratas do, from 1 to 12 inches thick, whilst at other points along the bluff—which is two and a half miles in extent, the tract containing near 600 acres, stratas go to 10 and 20 feet, yielding material suitable for bridge piers and other heavy masonry. The supply is inexhaustible, with the 2 to 10 inch stratas most abundant, as shown up in outcroppings, and only a seam separating all layers. It splits one way like ice; weather does not stain it; it is fire proof from tests; lasts always in side-walks, and being of a springy nature and much stronger than lime, stone, is more desirable for curbing; shoe nails will not wear it; it makes a fine polisher by rubbing two pieces of the same stone together—a high polish is quickly obtained without the use of water. Nature has provided drainage and for waste. The quarry has never been worked, except for a very limited neighborhood supply for the past thirty-five years. It is finely situated to supply all city demands. The heighth of bluff yielding stone, is from 60 to 125 feet, with stone cropping out from top to bottom at various points. This is the only deposit of the kind known in the United States. Slight down grade from top of bluff to railroad station which is only 800 yards distant from commencing point of quarry. Light stone capping over stone flagging—frequently none, showing itself on surface, as well as sides of bluff, always holding its uniform thickness. Try sharp edge of steel nail on surface of stone.

This specimen does not do the quarries justice. Would be pleased to hear from you as to what you think of the matter.

Yours very respectfully, CHAS RATLIFF.

Princeton, Ky., Oct. 20.

The specimen shipped us has not reached us in time to pass an opinion upon it in this issue. We shall examine the stone critically when the specimen is received.

SLATE BRICKS.

Bricks made from the refuse of slate quarries are stronger than stone; they stand 7,200 lbs. compression against 6,000 for stone, and 3,200 lbs. for common brick. The cost is $12 to $20 per thousand.

A syndicate has been formed by Gov. Gordon, Henry W. Grady and others, of Atlanta, and John H. Inman, Calvin Brice, Gen. Samuel Thomas, Dr. Norvin Green, and others, of New York, for the purpose of building a large city of Rockmart, and developing the slate and marble mines there. The slate mines, on which the syndicate have an option, are valued at $10,000,000. The quarries embrace about 200 acres of solid slate, which rises at certain points over 200 feet perpendicularly above the level of the plain. The slate in these mines is said to equal in every respect the slate of the famous Penrhyn mines of Wales. The marble quarries are quite as rich and exhaustless, and embrace every color and quality known in America. The property cost the syndicate $400,000 in cash and $4,000,000 in stock. Besides the marble and slate to be found on the property, it abounds in ochre beds and caen stone quarries. This stone when first quarried can be cut into any shape with any ordinary wood-working tool, and it can be worked as cheap as wood. It has a beautiful grain, almost cherry color, and although so easily worked when first quarried, becomes very hard on exposure. The property is very rich, and will be developed to the fullest extent by the new syndicate.—*Tradesman.*

We invite attention to our correspondence in this number. We desire our friends who have anything to present either of an instructive character, or as criticism of anything that may appear in our pages, to avail themselves of the privilege to write us for publication. Anything and everything in this line, not positively abusive, will receive courteous treatment from us, and prove entertaining to our readers. Correspond with us, good friends!

The competition for our prizes for best design for a memorial tablet, conditions of which will be found on inside front cover page of this issue of STONE, is not meeting with the response we had expected, but we hope sufficient designs may be received before the competition ends, to make the selection expressive over a wide range of subjects. The prizes are liberal, and worthy the effort of the best artists.

Dr. Henry M. Field has written a new book, which the Scribners will shortly publish under the title "Gibraltar." Dr. Field has made his description of the famous town and fortress exceedingly picturesque, to which the publishers will still further add interest by a number of beautiful illustrations.

BOOK AND PERIODICAL REVIEW.

"ADVENTURES OF PIONEER CHILDREN; OR, LIFE IN THE WILDERNESS." E. Fenwick Colerick. Illustrated, 12 mo., cloth, $1.00. Robert Clarke & Co., Cincinnati.

A fascinating book for the boys and girls of to-day. It is a condensation in one beautiful volume of tales of adventure in which the little heroes and heroines of the pioneer days in Ohio, Indiana, Kentucky and Virginia bore so conspicuous a part. It is a gleaning from the general history of our country and the local histories of the border wars, together with many interesting incidents, acts of heroism, and exciting adventures with wild beasts and the crafty Indian, founded on facts, obtained from the actors or their descendants, which have never before appeared in print. Thousands of the boys and girls of this older Western territory have heard their parents speak of incidents that are fully described and illustrated in this book. To these no richer gift could come than possession of this charming work. Sent by mail postpaid on receipt of price.

"THE ERRAND BOY; OR, HOW PHIL BRENT WON SUCCESS." By Horatio Alger, Jr. No. 14 of the "Boys' Home Library." Paper, 12mo. Price 25 cents. Published by A. L. Burt. 56 Beekman St., New York.

"THE ERRAND BOY" is the latest issue of the popular "Boys' Home Library," and is in Horatio Alger's well-known vein. It will be compared favorably with the best of his many stories for boys, and no one has better learned the secret of interesting the young folks than he. There is nothing "preachy" in his books, though their tone is high and pure; they tell of honest manly boys full of pluck and grit, just such youngsters as boys themselves like. The "Boys' Home Library" is one of the greatest successes of this era of cheap books. It gives high class stories for boys by famous authors at the nominal price of 25 cents.

"MANUAL FOR BUILDING AND LOAN ASSOCIATIONS." Embracing the origin and history of co-operative societies; objects and benefits of building associations; plans and methods of organizing and conducting them; legislation; constitution and by-laws; forms and description of books, blanks ane papers; interest and dividend tables; and a comprehensive variety of practical and useful information and suggestions. Henry S Rosenthal. 12 mo. 256 pages. Bound in cloth, price $1.50. Sent prepaid on receipt of price. Robert Clarke & Co., Cincinnati, O.

An invaluable assistant to any who are interested in the organization of these popular institutions. It includes all the information of a general or specific character required to enable intelligent working people in any community to organize and conduct a successful association.

"PREPARING FOR INDICATION." Robert Grimshaw, M.E. The Practical Pub. Co., New York. Price $1 postpaid.

We commend this work to every engineer. It embraces the specifications and instructions used by the author in his long experience at indicating engines. Any engineer, by adopting the methods set forth in this work, will be able to take off cards with as perfect accuracy as an expert, thus saving the large expense usually exacted for doing the work.

No. 1 Vol. II, of Collier's *Once a Week*, published October 20, is a literary marvel. Amélie Rivers commences a weird story, "On Bone's Island!" H. Rider Haggard begins a thrilling serial, entitled "My Fellow Laborer." Dion Boucicault continues his fascinating Irish-American novel, "Hy-Brasyl;" Bill Nye will be at his best; Edgar Fawcett and Julian Hawthorne contribute special papers; Marion Harland opens "Woman's World;" Nym Crinkle does the theaters; Miss Braddon, author of "Lady Audley's Secret," "John Marchmont's Legacy," etc., etc., commences a serial in No. 3, "It is Easier for a Camel;" John Habberton, author of "Helen's Babies," contributes a Southern sketch, "'Fo de Wah!", the famous Maxwell Fraser, LL.D., delivers a lecture on Ambition" for "Our Coming Men," and poetry, puzzles, etc., etc., and illustrations by Nast, Morgan, Sterner, McIlvaine, Ogden, Kendrick, etc., etc., complete the contents of this most wonderful seven cents' worth in the world. Who would be without Collier's *Once a Week?*

From now to January 1, you will be solicited to subscribe for a part of your reading matter for the year to come. Before deciding, get a copy of *Good Housekeeping* and look it through carefully and then decide whether your home can afford to be without its Fortnightly visits, for only $2.50 a year. If you are a subscriber we are satisfied you will remain one, for the unprecedented growth of that wonderfully popular and very practical magazine is without a rival and we are told its strongest admirers are those who have read it the longest.

STONE AND MARBLE OF GREAT BRITAIN.*

(Concluded from last month.)

THE constituent of granite that is generally the first to undergo decomposition is the felspar, although there are cases in which the felspar stands out in sharp well defined crystals, exhibiting quite as little tendency to decay as the other portions of the rock. In decomposing, the crystals lose their luster and as the disintegration proceeds, the potash and soda are washed away as soluble salts (for the most part as carbonates) leaving the hydrated silicate of alumina constituting the kaolin that remains. Experiments have been made which show that under favorable circumstances carbonic acid exerts an appreciable amount of action upon a variety of minerals, such as hornblende, serpentine, or apatite and that this action is augmented by increased pressure.

With respect to the origin of the enormous deposits of crumbling granite, such as those found in Devonshire and Cornwall (covering as they do a large area of ground, and having in some places a depth of more than 100 feet), no very satisfactory explanation can be given. The clay in some cases rests upon granite of the hardest description, and it is the opinion of the best authorities that these deposits have either never been properly consolidated, or that they are the results of surface decomposition which have been swept by the action of water into the spots which they now occupy.

In selecting stone for building purposes, too much attention cannot be paid to its physical structure, inasmuch as whatever may be its composition, stone which is of a hard, dense, crystalline character is not only capable of resisting more effectually the action of corrosive agents when in actual contact with them, but is not exposed to the same amount of contact as is the case with stone of a more porous character, for when rain falls upon a close, polished surface it cannot sink into the stone, and consequently any matter of a corrosive nature with which it may be charged does not remain in contact with the stone for any length of time, but is carried off before it has had an opportunity of exercising an injurious effect. It is obvious that the more crystalline and compact is the character of the stone, the more capable it is likely to be of resisting the effects ordinarily produced by exposure to atmospheric influences, whether such may be of a normal description, or whether they may be of a more powerfully corrosive nature. It is to its physical structure alone that marble (which consists of carbonate of lime) owes its durability; its highly crystalline character rendering it sometimes capable of being favorably compared with granite, as is the case in some of the churches of Devonshire erected from 400 to 500 years ago, in which the marble shows fewer signs of alteration than the granite.

The importance of the crystalline structure, as affecting the durability of stone, appears to have been recognized from a very remote period. Whoever the constructors of the great pyramid may have been, and whatever purpose they had in view in carrying on a work involving such an enormous amount of labor, it is quite certain that they must have been proficient in the art of building in stone. They appear to have exhibited much skill in its selection, and were acquainted with the best methods of dealing with large blocks, fully appreciating the advantages to be derived from fitting such blocks as closely together as possible with very thin joints. The celebrated red porphyry of Egypt, which derived its name from its purple color, was hard enough to be capable of taking a fine polish, and was largely used by the Egyptians and subsequently by the Romans, for statuary purposes. It was upon a circular slab of this material, now at St. Peter's at Rome, that the Roman emperors were crowned. Columns of porphyry, after the lapse of 1,900 years, still exist which retain their freshness of color. The term porphyry is now applied to any rock having distinct crystals embedded in a felspathic matrix, and is used to designate the crystalline character of a rock. We have thus quartz porphyry, porphyritic granite, porphyritic greenstone. Cornwall is especially rich in these porphyritic rocks, a very excellent material, capable of taking a high polish, being obtained from the neighborhood of Bodmin. It was a schorlaceous variety of this description which is found on the surface in immense boulders near Luxullian, and hence known as luxullinanite, that was selected for the sarcophagus of the late Duke of Wellington in St. Paul's Cathedral. The very perfect condition in which works of art of such great antiquity as those of Egypt have been found is no doubt due to the dryness of the climate of Egypt, but still in part, to the excellent quality of the material employed. The syenite granite of Egypt was extensively worked as far back as 1,300 years, B. C., the quarries whence it was obtained occupying an extensive tract of land between the first cataract of the Nile and the town of Assouan, which now stands near the site of the ancient Syene.

The famous Egyptian obelisks, one of which, known as Cleopatra's Needle, originally erected at Heliopolis (the "On" mentioned in the book of Genesis) about 1,800 B. C., and now standing on the Thames embankment, were obtained from these quarries. The obelisk at Rome was also one of those that stood in front of the Temple of the Sun, where it is said to have remained for 2,000 years before it was removed to Rome by Cæsar Augustus after the battle of Actium.

It is remarkable that the neighborhood of this ancient Syene, which for thousands of years had been the frontier town dividing Egypt from Nubia, should now in this nineteenth century be the site of explorations which are creating so much interest. On examining the sandstone hill on the west bank of the Nile, the removal of the sand led to the discovery, in 1885-6, of a series of tombs where the nobles and chiefs of ancient Syene had been buried, containing inscriptions which indicate that the hill had been used as a cemetery as far back as 3,000 B. C. From these incriptions much interesting information is to be gathered of the manners and customs prevailing at the remote period to which they allude, some of them being of great historical interest. The freshness of the paintings on some of the shrines is surprising, and the colors are wonderfully true to nature. The hieroglyphs for granite hills are good representation of granite, and that of an elephant is painted in a greyish sepia the exact color of the animal.

Of the granites used in this country for building purposes, the most important are those obtained from Devonshire and Cornwall, and the Scotch granites. The Scotch granites are too well known to require any lengthened description. We find examples of the grey granite of Aberdeenshire in nearly every cemetery, and columns of celebrated red granite of Peterhead adorn the public buildings of almost every town of importance.

The Cornish and Devonshire granites are of a more porphyritic character than the Scotch granites, the crystals being of a larger size. As regards the relative durability, they are both of them, when properly selected, of so permanent a character as to allow of the selection of either the one or the other for any engineering work being made upon other considerations than their relative liability to decay. The Devon and Cornish granites possess an advantage, inasmuch as blocks of a much larger size can be obtained of these granites than from the Scotch quarries. Granite obtained near the surface, and near the edges of the formation, is not unfrequently defective owing to imperfect crystallization, and the use of such granite is considered to have been the cause of the unsatisfactory condition of some of the Cornish granite used in the erection of Waterloo bridge, which has sometimes been referred to as a proof of the inferiority of the Cornish granite to the Aberdeen granite, although Cornish granite from the same district has been found to be perfectly satisfactory when used for the Thames embankment and elsewhere.

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*A lecture delivered before the British Society of Arts, by W. Y. Dent, F. C. S., F . C.

The Shap Fell granite of Cumberland is porphyritic in its character and is easily recognized by the large crystals of red felspar which are too conspicuous to escape being noticed. There are two varieties of this granite, the dark and the light colored. The dark variety has of late years been largely employed in many parts of London, and of this we have a good example in the posts at the western entrance of St. Paul's Cathedral.

The so-called Leicestershire granites form a remarkable and very interesting series of crystalline rocks which are quarried within a radius of about twelve miles from the town of Leicester, known as the Charnwood Forest range. Of these the Mountsorrel is a syenite or hornblendic granite, of which there are two varieties, a grey and a red, the grey blocks being sometimes colored red at their edges, from which it would appear that the coloring matter (consisting mainly of iron oxide) has been absorbed through the joints of the rock. Blocks are obtained of a sufficiently large size for building purposes, but it is more extensively used for paving setts and road metal. The rock is traversed by a basaltic dyke, running right through the hill, known locally as "blue stone," which is used for road metal only. The Groby and Markfield quarries are very much alike as regards the materials they yield, but it is of a still more syenitic character than that obtained from Mountsorrel, and would formerly have come under the designation of syenite; it is largely used for kerbs, paving setts and road metal. The Stoney Stanton quarries yield a material similar to that obtained from Groby and Markfield in its composition, but differing in structure, which is used for the same purposes. That obtained from the Barden Hill and Charnwood Sheepshed quarries partakes more of the character of greenstone. The Barden Hill has somewhat of a slaty cleavage, and, as it will not break into cubes, can only be used as road metal. The granite yielded by the Sheepshed quarries possesses the highest specific gravity of the series; it can be made into paving setts, and is also used for road metal. The excellence of the Leicestershire granites, as well as those of Guernsey, for the purpose of making paving setts, or for road metal, does not depend so much upon specific gravity or hardness, or upon the amount of resistance they offer to a crushing force, as upon their peculiar toughness, which is probably derived from the manner in which the crystals composing them are interlocked with each other.

In the paving of the quadrangle of the Indian and Colonial offices both the red and the grey varieties of Mountsorrel granite have been employed. Granite is imported from Norway, which finds a ready demand for kerb stones, for which it is particularly adapted on account of the length of the blocks in which it is supplied.

Some of the indurated sandstones that have been converted by pressure and infiltration of silica into quartzite, form an excellent material for road metal, of which we have an example in that quarried at Pontesbury, near Shrewsbury.

Amongst granitic or metamorphic rocks may be classed that very beautiful material for decorative purposes, known as serpentine. Varieties of this rock are found in various parts of the world, in the mountains of the Alps and the Vosges, at Portsoy in Scotland, where it is known as Portsoy marble, and in West Galway, where it is termed Connemara marble. The term marble is restricted by geologists to limestones which are capable of taking a fine polish, but the term is still employed (in what very probably was its original meaning, since the name is derived from a Greek word signifying gleaming or sparkling) to designate any kind of stone, irrespective of its composition, that is capable of being polished. In no part of the world is serpentine seen to greater advantage than in Cornwall, where it forms a large portion of the promontory of the Lizard, much of the beauty of the celebrated Kynance Cove being due to the variegated colors of the serpentine rocks by which it is surrounded. The value of serpentine depends upon the variety and beauty of the colors it displays, and on the fact that, although it is capable of being easily polished, it is a comparatively soft rock, and can be readily cut and turned in a lathe. It is a hydrated silicate of magnesia, and is liable to deterioration by exposure to the weather in this climate; it is, consequently, employed chiefly for interior decorative work.

TWO WAYS OF DOING BUSINESS.

WE know of a case of a man who has grown old as the owner of a first-class stone quarry near a populous city, one in which there was a great deal of building, and yet to-day, this old man is worth no more in dollars and cents than he was twenty or thirty years ago. In another case we know where two young men purchased a quarry which every one said was unfavorably situated and who have been running it for about five years and recently sold it for a large sum of money. In the meantime they have been making money out of it. The sale was brought about through a misunderstanding in the partnership which would not have come about excepting because of its prosperity.

The owner of the first quarry was what is called a hard worker. He would get up at five o'clock in the morning, work around the house and barn until six, eat his breakfast and go to the quarry and work among the men, until nine or ten o'clock. Then he would go to the town near by, get his mail, read it standing up in the postoffice, stick the letters in his pocket and go to the quarry again. Possibly he would answer a letter, more probably he would go out in the quarry and work until dinner. During the afternoon the performance was repeated, including a trip to the postoffice. One or two days in the week he would make a hasty trip to the city, going in on the five o'clock train in the morning and returning at noon. This trip was for the purpose of making collections, seeing his customers and drumming up a little business. When the young men bought the quarry the old gentleman said: "Well, the boys will have to work a good deal harder than ever I knew them to do or they will mighty soon run through with every dollar, and they don't know anything about quarrying anyhow. I'll give them just a year if they stay in the business to get through with every dollar they put into it. Working as hard as I do it is hard enough to make both ends meet, and with fellows who are not used to work I know it will be a dead loss. They've opened an office in the city. Now I can't afford that and I know they can't."

The way it worked was this: the young men did open an office in the city. It was in one of the best blocks. One of the young men stayed in the office and devoted his attention to looking for business. Another one was at the quarry or on the road. They hired a first-class superintendent to look after the practical details. The young man who did the traveling had formerly been a builder's clerk and knew something about taking off quantities. The result was that they knew everything that was going on. They made figures on the best and largest business. And in a short time were doing a large business.

How about the freight rates, may be asked, the quarry not being so favorably situated. As soon as this difficulty manifested itself, an executive officer of a railroad which passed near, but had not formerly communicated with the quarry, and had not been thought of in connection with it, was interested and a switch run to it. Their business now grew so large that they couldn't fill all their orders promptly. Not so with the old gentleman. When business was brisk he had all he could do, which was not a great deal. The successful carrying out of the details of his business was largely dependent upon individual efforts. If there were demands o nhim in the city he had to be there. With no head at the quarry things would get mixed up at that end of the line. When he was away from the quarry he knew things were going wrong. When he was not in the city his customers were conscious of trouble there. It frequently happened that when the business was in the best shape, as far as orders were concerned, the boiler would spring a leak and had to be repaired or some other of the important machinery would break and then everything had to be shut down. The old man said it was his luck, but it was not. It was simply that the machinery had been badly cared for and was not equal to the unusual strains of a fair business.

The old gentleman heard of the success of the younger men, couldn't understand it. He went into their office, saw one of them sitiing at a desk with a clerk at his side writing letters, while he himself appeared to have little to do. He knew that they were doing business but he couldn't and wouldn't understand it. He might have seen, if his experience had not been against instruction or learning, that with the business fairly well organized the strained efforts of the individuals connected with the work is not necessary or desirable. It is merely required that the right thing be done at the right time. He could have seen that a certain amount of leisure with the individuals of the organization is necessary in order that the unexpected, which is constantly happening, may have some one with a clear head to take care of it. Now in the case of our quarry organization with the young men, one had nothing to do but to take care of the general business management in the office, the other was on the road or at the quarry. There was a practical superintendent who had nothing to do but to take care of the men and handle the stone and he had, as the business improved, abundance of proper machinery to do the work. As a result everything moved together. When stone was wanted it could be had. They built up a custom that knew it could get what was wanted when it was wanted. In the case of the old man it was different. When his customers did not want stone he could furnish it cheap. When they all wanted it there were delays. In the end he had to furnish it cheap, or not at all. Now as it is, no one goes to him unless they have a close contract and have to buy the stone for less than it is worth, and with this kind of business he occasionally meets a loss. He is a worthy, honorable old gentleman living within our sight, but destined to die as a poor, broken-down old man.

THE FAIRY ROCKS.

The Smithsonian Institution at Washington has sent an expedition to Nova Scotia and secured fac-similes of the "fairy rocks," on which are curious hieroglyphic characters, evidently very old, which may throw some light on the history of the early discoveries of America. The markings are cut in upon a rock of highly-polished slate, and the intaglio is about a sixteenth of an inch deep.

CONVENTION OF MARBLE AND GRANITE DEALERS OF NEBRASKA.

The Marble and Granite dealers of the state of Nebraska will hold a convention at Lincoln, in the state of Nebraska, November 15, 1888, at 2 o'clock P. M., the convention having for its object the general improvement and elevation of the trade, in all its departments; the promotion of social and friendly intercourse, and honorable dealing between its members; upright and fair business transactions with their customers, and protection of purchasers from impositions practiced by illegitimate and irresponsible dealers, and every effort to work against unfair and unscrupulous methods of doing business, and if found proper to adopt constitution and by-laws similar to those of Ohio and other associations.

Furthermore, it is of great importance to petition our Legislature at their next session to enact a law creating liens in favor of manufacturers of and dealers in marble, granite and stone and other cemetery work, for the collection of debts, as our present law prohibits marble and granite dealers from claiming their property after its delivery, and allows dishonest purchasers to swindle them out of their just dues.

The necessary arrangements to make it comfortable and agreeable in the way of hotel accommodations, (and reduced railroad fare if it can possibly be secured) will be attended to by a temporary committee selected by the undersigned, and when the arrangements are made, notice will be given in time.

All wholesale marble and granite dealers from other states are also courteously invited to be present or represented.

Come one, come all, and help to elevate our business and profession to a more respected standard, and try to help to lay the foundation for some sound principles to build upon, and let us at least try to get above the category of "tin and lightning rod" peddlers.

It is not the object or intention of this call to form a ring, pool, or combination, as some may be pleased to term it, for the purpose of extorting unreasonable prices for our work.

All those who expect to attend will please notify the temporary secretary.

CHAS. NEIDHART, Temporary Sec.
Brownville, Neb.

A. H. BROWN,
KIMBALL BROS.
HEATHER & KEIM,
JAS. PAILEY,
J. V. SWEENEY,
} Temporary Com.

WE ARE NOT AUTHORITY FOR THIS.

A most remarkable discovery has been made at the Salomonic quarries near Montpelier, Vt. The blasts at this quarry are set off by a battery, and are very powerful. Recently a blast opened up a fissure which was filled with clear water, brackish to the taste. The hole was about 12 inches wide, 10 feet long and eight feet deep, the bottom and sides being solid rock, and isolated. The water in it was in a marble basin. In the water was found numerous fish and frogs, which differed from the ordinary species in that they have no eyes. From the surroundings it would seem that the fish and frogs had lived there thousands of years. Several places in these quarries show traces of volcanic action.

Magistrate (to woman)—"You admit that you hit your husband with a stove-lid, and yet you claim there are extenuating circumstances governing the case."

Woman—"Yes, sah, dey was a extenuatin' circumstance. De stove-lid wasn't hot."

MINERAL WOOL.

THIS wool is out of the reach of tariff tinkering. It isn't that kind of wool. It is distinctively an American product. The manufacturers say that it is simply a fibrous stone, stone melted to a flux and blown to a fiber. Its uses are various indeed. It has great power of resisting the transmission of heat and cold. Its fibrous quality, its softness, the various particles interlacing each other, giving, as it does, the appearance and feeling of a soft wool lends to it that quality which has made felt and other material of that character so successful in resisting the transmission of heat and cold. Its use as a fire-proofing material is distinct from that of any other substance of similar nature. No material so light in weight, so soft and pliable, has the quality of being so absolutely indestructible. It will convert a frame building of a highly combustible nature into one which is slow to burn, and for that reason in a condition to prevent anything more than small loss by fire. It has been clearly proven through the experience of the factory mutual insurance companies of New England that it is not the iron, so-called, fire-proof buildings that make the best risks, but rather those which are constructed in a manner to be slow to burn, with protected wood as the strength-giving material. While wood will ignite, its strength is not affected by the same heat that would render iron utterly useless. Closely allied to protection from fire is the use of mineral wool for frost-proofing. It is largely used in connection with refrigerators, cold storage houses, railway coaches. For the protection of water pipes from freezing it is eminently successful. One of its large uses is for steam-pipe covering. Practical experiments have given it the highest rating. Among other of its uses might be mentioned at some length the insulation of sound, protection against rats, ice, insects and disease germs. It is used in floors of structures of all kinds, in partitions, under roofs. Our illustrations show its adaptation to this purpose. It is successfully used as a boiler covering, surrounding not only the upper part of the shell and drum, but as a lining outside of the fire-box. We here give a table showing its value as a non-conducting material:

Experiments made upon various materials for the purpose of determining their heat-conducing power, was given in a paper read by Mr. J. J. Coleman, before the Philadelphia Society, of Glasgow:

Mineral Wool	100
Hair Felt	117
Cotton Wool	132
Sheep's Wool	136
Infusorial Earth	136
Charcoal	140
Sawdust	163
Gas Works Breeze	230
Wood and Air Space	280

Mineral wool appears in a variety of colors, principally white, but often yellow or gray, and occasionally quite dark. The quality of the wool is not at all dependent upon or affected by its color, as all the peculiar properties which constitute its value are present in equal proportion in any of the shades. Mineral wool partakes of the nature of glass without its brittleness, the fibers being soft, pliable and inelastic. They are of irregular thickness and cross each other in all possible directions. It is made by converting Scoria and certain other rocks while a melted condition to a fibrous state. There is a widely spread impression among architects and builders that the use of mineral wool in building residences is precluded by its cost. This is erroneous. On the contrary, the material is low in price, and the extra expense of its use is far from being commensurate to its value, and the additional comfort and protection it affords. This error has grown out of the fact that many people over-estimate in consequence of not making sufficient deduction for openings, thickness of studding, joists, etc.

The Western Mineral Wool Co., of Cleveland, O., the largest manufacturers of this material in the country, will furnish all desired information in regard to this product.

PROGRESS OF GEOLOGY AS A SCIENCE.

GEOLOGY is a new science. When other sciences were well developed our knowledge of the history of the earth itself was meagre indeed, and it is only in the last fifty years that any substantial progress has been made. One of the first exponents of this science in this country was Prof. Amos Eaton who graduated from Williams College in 1799. In 1817 he delivered before the students of the college his first geological lecture and his success was so great that he continued the work, giving lectures not alone to the students of this college, but appearing before miscellaneous audiences, before the legislature of New York, at Albany, and in various colleges. It is said that he had more than seven thousand pupils or auditors and the result of his labors was that geology became in a way a rage, it was talked of on steamboats, in hotels and every public place. The work of Prof. Eaton found an ardent supporter in General Stephen Van Rensselaer who rendered him substantial pecuniary support, enabling him to travel 17,000 miles through New York and neighboring states, and making it possible for him to publish his maps and reports. Finally the Rensselaer Institute at Troy, N. Y. was established with Prof. Eaton at its head, where he did much excellent work.

Some of Prof. Eaton's views strike the reader of this day as being very remarkable, but when we consider that the beginnings of every science are gropings in the dark and that enlightenment comes from the verification of some one of many suppositions or guesses it is readily understood that while many of the efforts of conscientious workers were useless only in so far as they proved that a certain proposition was not true, the general result of his labor was for much good.

One of his many ideas was that the various formations of rock on the surface of the earth originally covered it like the concentric rings of an onion, that under them at the creation in six north and south lines were placed combustibles and that at the end of a certain period these were ignited. The result was a great explosion which uplifted the mountains. He supposed that there had been various minor explosions since that time, but that now the combustibles were about exhausted and that they could only produce a small disturbance such as an ordinary earthquake. It was not known then that every strata was distinguished by the fossils it contains, and that these fossils are the same the world over in the same formation. The only way he knew of placing a formation and its relative age was by tracing it over large tracts of country and comparing its general peculiarities.

Prof. Eaton, however, recognized the incompleteness of his knowledge. He said that he had been compelled to abandon many errors and to make so many changes in his books as to provoke the charge of fickleness. One of his last statements before he died about 1840 was that he stood ready to abandon any of his views whenever new discoveries made it necessary.

Prof. Eaton was followed by several men who did excellent work but were not particularly eminent in their profession. Then came Prof. Dana whose reputation is world wide. But much of the best geological work has been done by men whose names are almost if not entirely forgotten, who investigated from a love of the science and who acquired no reputation.

The growth of geological knowledge has been rapid. Geologists have brought to bear on the subject not only a faculty for investigation and deduction, but have appealed to astronomy, to chemistry, to mineralogy and various other sciences for help. The most enthusiastic of men have been devoted to this science, than which none so well repays one for study and investigation. It is perhaps true that no one ever made anything like a thorough study of geology without becoming an enthusiast. In these days with geological museums at our very doors, with the best of literature at our command, with state geologists in nearly every state who bring out reports every year, with the general government adding to our stock of available knowledge, it is difficult to realize the obstacles which our earlier workers in this branch overcame, and perhaps still more difficult to realize why we, with all this wealth of knowledge at our command, do not take a more general interest in the subject.

SCOTCH RED SANDSTONE.

THE old red sandstone of Scotland has been extensively employed for the purposes of the architect, and its limestones occasionally applied to those of the agriculturist. As might be anticipated in reference to a deposit so widely spread the quality of its sandstone and its lime is found to vary exceedingly in even the same beds when examined in different localities. Its inferior conglomerates, for instance, in the neighborhood of Cromarty, weathers so rapidly, that a fence built of stones furnished by it a little more than a half century ago has mouldered in some places into a mere grass-covered mound. The same bed in the neighborhood of Inverness is composed of a stone nearly as hard and quite as durable as granite, and which has been employed in paving the streets of the place—a purpose which it serves as well as any of the igneous or primary rocks would have done. At Redcastle on the northern shore of the Frith of Beauly, the same conglomerate assumes an intermediate character, and forms, though coarse, an excellent building stone, which in some of the older ruins of the district, presents the marks of the tool as sharply indented as when under the hands of the workman. Some of the sandstone beds of the system are highly saliferous; and these, howevor coherent they may appear, never resist the weather unless first divested of their salt. The main icthollite bed on the northern shore of the Moray Frith is overlaid by a thick deposit of a finely tinted yellow sandstone of this character, which, unlike most sandstones of a mouldering quality, resists the frosts and storms of winter, and wastes only when the weather becomes warm and dry. A few days of sunshine affect it more than whole months of high winds and showers. The heat crystallizes at the surface the salt which it contains; the crystals acting as wedges, throw off minute particles of the stone; and thus, mechanically at least, the degrading process is the same as that to which sandstones of a different but inferior quality are exposed during severe frosts. In the course of years, however, this sandstone, when employed in building, loses its salt. Crust after crust is formed on the surface, and either forced off by the crystal beneath or washed away by the rains; and then the stone ceases to waste and gathers on its weathered inequalities a protecting mantle of lichens.

TESTS FOR SLATE.

A German trade journal advocates the following method for testing the qualtity of roof slates: The samples of the slate to be tested should be carefully weighed, and then put into boiling water for a quarter of an hour. The water must, however, be fairly free from lime, saltpetre and ammonia. The slates are then re-weighed, and those that show the greatest increase of weight are those most capable of resisting deterioration.

The Cyclopean masonry was not limited to Greece. Two fine specimens occur in Italy, at Ausidonia and Saturnia, towns anterior to Rome.

THE JESUP COLLECTION OF BUILDING AND ORNAMENTAL STONE.

AT the American Museum of Natural History, situated at 77th street and Eighth avenue, New York City, a collection of economic materials is being made, among which the different kinds of commercial woods of the United States, and building and ornamental stone are taking a prominent part. Among the latter there is one collection consisting of 1,050 specimens, mostly four inch cubes, each of the six faces of which presents a distinct mode of dressing, presenting the stone in all its different phases of polished, chiseled, hammered and broken surface, thus showing the capabilities of the material and its applicability to the different uses to which it can be applied. The collection represents nearly the same number of quarries that there are individual specimens, and has been gathered from quarries throughout the entire country, nearly every state in the Union being represented, from Maine to California, and from Vermont to Texas. The collection has been made at great cost, and ought to be appreciated by builders, architects and those dealing in or using any grade of stone for commercial, building or ornamental purposes. It is open for free consultation by anyone wishing to ascertain the appearance or qualities of any of the stones present, and the labels give the location of the quarry, and the firm name or individual working the quarry, as well as the name of the stone, (as granite, limestone, etc.) and the geological formation to which the bed belongs, with other items of information. There is also in the possession of the Museum a thin section of each individual specimen prepared for microscopic examination, many of which are reported upon in Vol. X of the Tenth Census Report; this collection being a duplicate of the one used for that report.

Such collections as this one certainly ought to be useful, and prove of great service to those using such material in the vicinity where they are situated, and it certainly reflects great credit upon the Museum and upon the president of the institution, Mr. Morris K. Jesup, who we believe has individually borne the expense of this collection and also that of the wood. Following we give a list of the specimens in the collection under the number of the block, mentioning the kind of stone, the name of the quarry or the name of the firm or individual working it, together with the locality, the name of the person who collected the block and the geological position of the bed from which it was taken. The geological position has been obtained from various sources. That of New Jersey and New York specimens have been submitted to Professor John Smock, who collected most of them. Those of Vermont and New Hampshire to Prof. C. H. Hitchcock; those of Ohio and Indiana to Prof. Edward Orton; Minnesota to Prof. N. H. Winchell, and Iowa to Mr. W. J. McGee. Many of the others were obtained from the Tenth Census Report, or from the labels accompanying the blocks. But a very large proportion of the whole has had to be gotten from various reports, geological maps, etc., and some of them may be incorrect.

On the completion of the new section of the Museum building, now in progress, it is intended to arrange the above collection with all such material, and also other material, such as blocks of ore and similar substances of economic importance, so as to form an economic exposition, and persons who are engaged in quarrying, mining, etc., can easily contribute to its success by sending to the Museum blocks or samples of their quarries. There is already on hand a large quantity of twelve inch and smaller cubes, representing both foreign and American granite, marbles, sandstones, limestones and other forms of useful stone products.

We give the complete catalogue of this wonderful collection, compiled for STONE by Prof. R. P. Whitfield, curator of the Geological Department of the Museum. It has never before been presented in public print.

ALABAMA.

NO	NAME.	QUARRY	LOCALITY	COLLECTOR	FORMATION
27825	Limestone	Bowser's	3 m. below Tuscumbia	W R King	L. Carboniferous
			ARKANSAS.		
26524	Sandstone	Bald Knob	Bald Knob	G C Broadhead	
27519	Hornblende Syenite	Diamond Jo	Lime Hot Springs R. Rd	J S F Batchen	Coal Measures ?
			BERMUDA ISLAND.		
25244	Limestone			Centennial Com	
25245	"			" "	
25247	"			" "	
25248	"			" "	
25249	"			" "	
			CANADA.		
27802	Sandstone	Verb Island	Nepigon Bay, L. Super'r	J S F Batchen	Cambrian.
			CALIFORNIA.		
25256	Marble		Suisun City	Centennial Com	
25539	Biotite Granite	Griffith Griffiths's	Rocklin	Wm Foster	Archæan
25542	Hornblende Biotite	" "	Penryn	" "	"
25554	Do. Granite	" "	"	" "	
25569	Sandstone		Range E. of Alameda	" "	
25570	"	Angel Island	Angel Island	" "	
25636	Limestone	Colfax	Colfax	" "	
25644	Basalt	J Codden Bros	Near Petaluma	" "	Archæan
25668	"	Thompson's	Bridgeport	" "	
25665	Sandstone	Livermore	Livermore	" "	
25797	"	Goodrich	8 m. s. of San Jose	" "	
25798	"	"	" "	" "	
25799	"	"	" "	" "	
25800	Tuff		Near Cordelia	" "	
25801	Sandstone		Haywards	" "	
			COLORADO.		
25783	Sandstone	Fort Collins	Fort Collins	Wm Foster	Cretaceous
25787	"	" "	"	"	"
25784	Biotite Granite	Government	Platte Canon		Archæan
[illegible]	" "		" "	J S F Batchen	"
25786	Sandstone	Blodgett & Mills	Near Canon City	Wm Foster	Cretaceous
25786	Rhyolite Tuff	G F Girardot	2½ m from Castle Rock	"	Volcanic
25788	Sandstone	Trinidad	Trinidad	"	Cretaceous
25789	"	Coal Creek	Coal Creek	"	"
25791	"	Brandford	Arkansas River	"	
27734	"	Morrison & Golden	Golden	E L Berthoud	"
27861	Rhyolite Tuff	Colorado M'f'g Co.	Douglass	Colorado M'f'g Co.	Volcanic
35665	" "	Garfield Co.	" county	J S F Batchen	"
35987	Biotite Granite		Georgetown	"	Metamorphic
35995	Limestone	Morrison	Morrison	"	Jurassic
36865	Sandstone	Winkler	Greeley, S. L. & P. R.R.	"	Cretaceous
36866	Quartzite	Huck & Co	Pitkin	"	
35839	Sandstone	C J McWhorter	Buckhorn	"	
35840		G E Trowbridge	"	"	
35841	Granite		Monarch	"	
			CONNECTICUT.		
17547	Dolomite Marble		East Canaan	Centennial Com	Metamorphic
17548	"		" "	" "	"
17549	"		" "	" "	"
17550	"		" "	" "	"
25901	"		" "	" "	"
17551	Biotite Musc Gran		Norwalk	" "	Archæan
17552	Biotite Granite		Leetes Island	" "	"
25424	Sandstone	Middlesex Quarry Co.	Portland	H W Lindsley	Triassic
25483	"	Shaler & Hall	"	" "	"
25977	"	Brainards & Co.	"	" "	"
25425	Biotite Granite	J B Palmer & Co	Waterford	" "	Archæan
25484	" Gneiss	Oneco Ledge Co.	Sterling	" "	"
25388	" "	J W Boswell	"	" "	"
25485	" Granite	Merritt, Gray & Co.	Groton	" "	"
25618	" Gneiss	C D Allen	S of Brandford	" "	"
25912	Diabase	C W Blakeslee's	West Rock	" "	Triassic
25947	Biotite Granite	J Robbins	E bank of Stony Creek	" "	Archæan
26428	Sandstone	C O Wolcott	Manchester	" "	Triassic
26429	"	" "	"	" "	"
26169	Dolomite	Mathbys	Falls Village	" "	Metamorphic
26290	Biotite	Truesdell	Stafford Springs	" "	Archæan

CONNECTICUT—*Continued.*

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
26298	Biotite, Musc. Gran	Plymouth Granite Co	1 m. e. Thomaston Sta	H W Lindsley	Archæan
26299	Biotite Gneiss			"	
26327	H'blend Bio. Gneiss	Arnold's	Haddam	"	"
26337	Biotite Musc. Gran.	Imperrang	Branchville	"	
26369	H'blend Bio. Gneiss	F Ritch	Greenwich (L. I. Sound)	"	
26415	Biotite Gneiss	C Hentz	East Glastonbury	"	"
26416	Biotite Granite			"	"
26451	Biotite Gneiss			"	
26453	Sandstone	E Rednetd	East Haven	"	Trias
26649	H'blend Bio. Gneiss	W Beers	North Bridgeport	"	Archæan

DELAWARE.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
25401	Augite H'bld Gneiss	P P Tyre	Near Wilmington	J H Huntington	Archæan
25402	Dolomite	Jackson Lime & Marble Co	Hockessin	"	

DAKOTA.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
25662	Sandstone	J L Phelps	Sioux Falls	N. H. Winchell	Potsdam

FLORIDA.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
18708	Oolitic Limestone				
25813	Limestone		Alachua	J S F Batchen	Eocene?
25814	Coquina		St. Augustine	C M Terry	Quaternary

FRANCE.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
26636	Limestone		Caen		Jurassic

GEORGIA.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
26005	Muscovite Granite	Stone Mountain	16 miles from Atlanta	Henry E Colton	Archæan
25916	Dolomite	Chicamauga	12 miles fr Chattanooga	"	L. Sil?
26367	Pink Marble, 2 spec	Georgia Marble Co.	Tate, Pickens Co.	Georgia Marble Co.	Metamorphic?
26368	White Clouded Mar.	"	"	"	"
26369	" " "	"	"	"	"

ILLINOIS.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
25640	Sandstone	Wm Haug	1½ miles from Xenia	A D Conover	Coal measures
25661	Sil. Mag. Limestone	J Taylor	6 miles N of Breese	" "	L. Carboniferous
25685	Limestone	J Hern	Chester	" "	L. Carb. (Chester)
25686	Limestone (2 specs)	N Ill. Penitentiary	1 mile N of Chester	" "	"
25687	Sandstone	"	1 " "	" "	" "
25714	Limestone	J Hern	3 " "	" "	" "
25822	Sandstone		3 " "	" "	" "
26526	Dolomite	Singer & Talcott	1 mile s e of Lemont	" "	Niagara
26527	"		½ mile N E "	" "	"
26528	"	Chicago Lemont Stone Co	Lemont	" "	"
26529	"	"	1 mile N E Lemont	" "	"
26530	"	Illinois Stone Co	1 " "	" "	"
26531	"	Earlshaw & Bodenschatz	½ mile S W Lemont	" "	"
26532	"	Excelsior Stone Co	1½ mile "	" "	"
26551	"	Kankakee Stone & Lime Co	Kankakee	" "	"
26559	"	A Berthold	Aurora	" "	"
26560	"		Aurora	" "	
27195	Sandstone	F Neibauer	4 miles E Dongola	F Neibauer	L. Carboniferous
27129	Limestone		Sagetown	J S F Batchen	" "
27346	Bit. Dolomite	H Rice & Son	Chicago	"	Niagara
27501	Dolomite	"	Chicago	"	"
27505	"		Sags Bridge	"	"
27748	"	Enterprise Stone Co	"	"	"
[illegible]	Limestone	Middleton	1 mile S Iuka	A C Donover	Coal Measures
26533	Dolomite	Joliet Stone Co	1½ mile N E Joliet	" "	Niagara
26534	"	"	Joliet	" "	"
26535	"	Wm Krommeyer	N of Joliet	" "	"
26536	"	J Nobes	2½ miles N of Joliet	" "	"
26537	"	"	" N "	" "	"
26538	"	Bruce & Co	" "	" "	"
26539	"	"	" "	" "	"
26540	"	Davidson Bros	"	" "	"
26541	"	C Warner	"	" "	"
26726	Limestone	C G Fleugh	Near Jonesborough	" "	Devonian?
26727	"	Fallenweller	"	" "	"
26728	"	Willard's	" "	" "	"
27189	Sandstone	J Day	2½ m. fr. Pinckneyville	John Day	L Coal or Conglom's
27810	"	J Cairn	Carbondale	J S F Batchen	L Coal

INDIANA.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR	FORMATION.
25032	Limestone		Bedford	Centennial Com	L. Carboniferous
25034	"		"	"	"
25033	"	Voris Rogers & Co	5 miles from Bedford	Edward Orton	" (St. Louis)
25094	"	Chicago Bedford Stone Co	Near Bedford	" "	"
25048	"	Hoosier Stone Co	Bedford	Hoosier Stone Co	"
25065	"		Vernon	Centennial Com	
25569	"	P Conklin & Co	North Vernon	Edward Orton	Hamilton
25156	"		Salem	Centennial Com	St. Louis
25682	"	E Zink	1 m W of Salem	Edward Orton	Warsaw Limestone
25037	Dolomite		Greensburg	Centennial Com	
25541		Greensburg Limestone Co.	3 m S W of Greensburg	Edward Orton	Niagara
25146	Limestone		Huntington	Centennial Com.	
25545	Bit. Limestone		Ellettsville	"	L. Carboniferous
25741	" "		Near Ellettsville	Edward Orton	St Louis limestone
25549	Marble	Bellevue	Fenneville	J H Huntington	
25540	Dolomite	J L Scanlan	St. Paul	Edward Orton	Niagara
25567	"	New Point	Near New Point	" "	"
25590	Mag Limestone	Hicks & Holmes	1½ m N of Oakdale	" "	Carb. Conglomerate
25591	Sandstone	B F Gregory's Estate	Williamsport	" "	
25596	Mag. Limestone	Ashman & Glasgow	Near Osgood	" "	Niagara
25597	Sandstone	S Bernharts	Attica	" "	Carb Conglomerate
25601	Limestone	Bridges & Scott	Wabash	" "	Waterlime & Niag
25602	Dolomite	Moellering & Paul	"	" "	Niagara
25630	"	Kapp & Gardner	Bluffton	" "	Waterlime (L Held.)
25631	"	Wm Tarbell	Montpelier	" "	Niagara
25683	Bit. Limestone	E B Dixon	Fort Ritner	" "	Warsaw limestone.
25748	" "	W H McHenry	Stinesville	" "	Warsaw
25749	Limestone	B Schweitzer	Spencer	" "	L Carb Warsaw
25750	Bit Limestone	Howard & Deaig	3½ m N E of Spencer	" "	Warsaw Limestone
25800	Siliceous Limestone	Jas Lee	Near Putnamville	" "	L Carboniferous
26276	Sandstone	T N Braxton	French Lick Township	" "	
26485	Dolomite	Wm Crim	Anderson	Wm Crim	
27002	"	S Frankboner	Marion	S R Frankboner	
27060	"	August Gleitz	3 m W Logansport	August Gleitz	
27303	Oolitic Limestone	Tomlinson & Reed	Avoca	J S F Batchen	
25470	Dolomite	M K Secrest	Near Laurel	Edward Orton	Niagara
25619	"	B P Rice	Decatur	" "	Waterlime (L Held.
25634	"	G W Carter	Eaton	" "	Niagara
26288	Sandstone	A Hallabach	3½ m E of Cannelton	" "	Chester grp (L.Carb.

IOWA.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR	FORMATION.
25829	Limestone	P O'Conner	2m S Mt Pleasant	N H Winchell	L Carboniferous
25408	Siliceous Limestone	E Crowley	Iowa City	" "	Hamilton
25409	Limestone	L O Hoffman	"	" "	"
25410	"	Penn. Quarry Co	10 m N W Iowa City	" "	"
25413	"	W Stennett	Stennett	" "	Up. Coal Measures
25444	"	Chilton & Kendall	Near Ottumwa	" "	
25445	"	Jas Kelly	"	" "	Keokuk
25447	Fer. Sandstone	J Woodward	Lewis	" "	"
25461	Limestone	Laird & Rogers	3 m N E Earlham	" "	Up. Coal Measures
25462	"	Robertson & Willoughby	2½ m E "	" "	" "
25675	"	Sheaver & Gray	3½ m S W Tipton	" "	" "
25702	Siliceous Dolomite	J H Peters	2½ m S E Delhi	" "	Niagara
25703	Bituminous "	D Horton	Hale	" "	"
25826	Ferruginous "	E Thiesmann	Near Le Claire	" "	"
25827	Bituminous "	Jas Gamble	Le Claire	" "	"
25828	Ferruginous "	T Purcell	Clinton	" "	"
25830	"	A Connel	4 m S E Maquoketa	" "	"
25993	Limestone	H W Greenlee	Bedford	" "	
25992	"		"	W J McGee	Up. Coal Measures
25499	Dolomite	Jos Hug	Dubuque	N. H. Winchell	" "
25904	"	Wm Redman	"	" "	Galena
25905	"	J S Fuller	Near Monticello	" "	Niagara
25906	Limestone	F C Mather	4 m e a Pella	" "	St. Louis
25907	Dolomite	C K DeRome & Co.	1 m e Farley	" "	Niagara
25901	Bit. Dolomite	H Dearborn	Stone City	" "	"
25931	" "	J A Green	" "	" "	"
25930	" Limestone	S Angst	3 m n w Vinton	" "	Hamilton
25960	Dolomite	G W Chapman	Near Iowa Falls	" "	Konderbrook
25987	Mag. Limestone	J Lisebow	Fort Dodge	" "	L. Coal Measures
26133	" "	T Dryer	Decorah	" "	Trenton
26215	Limestone	E H Williams	5 m s w Postville	W J Mc Gee	Niagara Limestone
26216	"	A C Folton	Davenport	N H Winchell	Hamilton
25967	"	H Schmiedt	Near Davenport	" "	"
26491	"	W T Creeline	Concord	" "	Kinderhook
25803	Siliceous Dolomite	City of Lansing	Lansing	W J Mc Gee	Potsdam
25812	" Limestone	Law & Oak	Near Coraing	N H Winchell	Up. Coal Measures
25566	Bit. Dolomite	Iowa Penitentiary	" Anamosa	" "	Niagara
25578	" "	D S Hahn	Mt. Vernon	" "	
25975	Siliceous Limestone	Garrison's	3 m n e Knoxville	" "	St. Louis
25705	Bit. Dolomite	A Rummel	1½ m s e Olin	" "	Niagara
25712	Calcareous Dolomite	Geo Olt	1½ m w Buffalo	" "	Hamilton
25990	Dolomite	C A & S A Davis	3 m s e Manchester	" "	Niagara
25000	"	E Carpenter	Cedar Falls	" "	Hamilton
25993	Siliceous Dolomite	Wm Lane	Near Waterloo	" "	"

Iowa—*Continued.*

NO.	NAME	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
26066	Mag Limestone	A T Lain & Bro	Near Mason City	N H Winchell	Hamilton
26067	Dolomite	Miner & Howell	1 m s e Dakota Station	" "	Kinderhook
26214	Bit. Limestone	C C Collins	2½ m n Durham	" "	St. Louis
26219	Limestone	J. Creasy	6 m w Keosauqua	" "	St. Louis
26489	"	Long Creek	8 m w Burlington	Chas Wechmuth	Burlington
26492	"	Cascade	Near Burlington	"	Burlington ?

KANSAS.

NO.	NAME	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
25375	Limestone	Reddington & Co	Near Atchison	G C Broadhead	Carboniferous
25418	"	White	7 m e Marysville	"	
25455	"	Kirwin	Kirwin	"	
25474	"		Bull's City	"	
25680	"	W L Wilkinson	Fort Scott	"	Carboniferous
25681	Sandstone	Gilfillan Bros	7 m w Fort Scott	"	"
25791	"	Bailey	3 m n Oswego	"	
26048	Limestone	L W Lewis	3 m e Cottonwood Sta	"	Permo Carb.
26091	"	Wolff, Pickens & Co	2 m from Dunlap	"	"
26092	"	Groat Bros	1½ m n e Marion Center	"	"
26130	"	J C Haines	1½ m e Augusta	"	Up. Permo Carb
26132	"		Near Augusta	"	"
26365	"	W Dickensheet	6½ m n Douglass	Clarence Pulles	
26490	"	Railroad	Wa Keeney	G C Broadhead	
26509	"	Ulrich Bros	1 m e Manhattan	"	Permian
26573	"	L Schmidt	2 m e Winfield	"	Permo Carb
26578	"	Hodges, Moore & Co	2 m e e Winfield	"	Permo Carb.
26575	Sandstone	Neodesha	Neodesha	"	
25796	"	Brown's	3 m e w Pawnee	"	Carboniferous
26095	Limestone	McElliotte	2 m e El Dorado	"	
26096	"	Parker's	3 m n e El Dorado	"	
26360	"		5 m e El Dorado	"	
26574	"		3 n w Grenola	"	
26579	Sandstone	Beard's	3 e Chanute	"	

KENTUCKY.

NO.	NAME	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
26285	Limestone	Belknap & Dumesnil	Near Bowling Green	Florisel Smith	L Carboniferous
26311	"	City of Louisville	Louisville	"	" ?
25108	"	Reilly Bros	Anchorage	J & F Betchen	Silurian ?
36853	"		Simpson Co	J R Proctor	L Carboniferous
36899	Oolitic Limestone		Hopkinsville	"	
36902	" "	G Lyles	Greensburg	"	"
36903	" "		Green County	"	"
36910	" "		Lebanon	"	"
36911	" "	Major Williams	1 m from Frankfort	"	L Silurian
36912	" "	Quirve	4 " "	"	"
36913	" "	Buttermen's	1 " "	"	"
36916	" "		Marion	"	?
36920	Sandstone		Livingston	"	L Carboniferous
36921	Limestone	Rockcastle	"	"	"
36928	Sandstone	Wm Adams	4 m e Berea	"	" ?
36934	Limestone		Springfield	"	" ?
36936	Sandstone		Johnson County	"	Coal Measures
36937	"		"	"	"
36939	Oolitic Limestone	McNary & Darby	Princeton	"	L Carboniferous
36950	Sandstone		Whitley County	"	Coal Measures
36956	Oolitic Limestone		1 m n w Litchfield	"	Carboniferous
36957	Limestone		"	"	"
36960	Oolitic Limestone		Near Garrett	"	L Carboniferous
36961	Limestone		Grahampton	"	" ?
36968	Sandstone		1 m below Cloverport	"	
36994	Limestone	Geo Lee	Taylor County	"	

LOUISIANA.

NO.	NAME	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
37579	Sandstone				

MARYLAND.

NO.	NAME	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
25016	Dolomite (2 spec.)		Cockeysville	Dr R N Singleton	L Silurian
25015	"		"	Col Clark	"
27062	"	Beaverdam Marble Co	"	Dr R N Singleton	"
25010	Soapstone	Geo Haddleson	Bethesda	Geo Haddleson	Achaean
25098	"	"	"	"	"
25358	Biotite Gneiss	C J Werner	Opp. Ellicott City	J H Huntington	"
25359	"	McClenahan & Bros	Port Deposit	"	"
25360	Biotite Granite	Fox Rock	Near Woodstock	"	"
25361	"	W F Weller	"	"	"
25403	"	Gill & McMahon	Granite	"	"
26173	Serpentine (2 specs)	Serpentine Marble Co	Harford County	"	"
26128	Steatite Soapstone	Balto & N Branch Co	15 m from Baltimore	Chas E Munroe	"
25078	Quartzite	J L Belt	Frederick County	A M Belt	Cambrian?
26797	Conglomerate	Gertzendanner	Near "	J W Gertzendanner	Triassic
26407	Mag Limestone	A A Hoop	New Windsor	Chas E Munroe	L Silurian?

Maryland—*Continued.*

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
26031	Mag Limestone	W N Chew	New Windsor	Chas E Munroe	L Silurian
26829	"	D Rinehardt	Union Bridge	"	"
26836	Gneiss		Ilchester	"	Archaean

MAINE.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25644	Biotite Granite	Maine Red Granite Co	⅓ m w Red Beach	J E Wolff	Archaean
25672	"	Bodwell Granite Co	Jonesboro	"	"
26049	"	J H Stinson	West Sullivan	"	"
26073	"	Blaisdell Bros	Franklin	"	"
26124	"	C J Hall	Somerville	"	"
26125	"	Whitney & Allen	"	"	"
26138	"	G W Collin & Co	East Blue Hill	"	"
26139	"	Chase & Hall	"	"	"
26153	"	Harbor Quarry	Vinalhaven	"	"
26166	"	Duncham Hill Quarry	"	"	"
26167	Olivene Diabase	Sands Quarry	"	"	"
26155	Biotite Granite	Goss & Goss	Deer Island	"	"
36019	Serpentine			Geo P Merrill	"
26176	Hornb'de Bio. Gran.	Long Cove Granite Co	St. George	J E Wolf	"
26178	Biotite Granite	Atlantic "	4 m e St. George	"	"
26212	"	Clark's Island	3½ m e e "	"	"
26179	"	Bodwell "	Spruce Head Island	"	"
26180	"	D Jilson	Hurricane	"	"
26181	"	M T Jameson & Co	South Thomaston	"	"
26182	"	Dix Island Granite Co	Dix Island	"	"
26242	"	Brown, McAllister & Co	Round Pond	"	"
26309	"	Grand Trunk R'y	Bryant's Pond	"	"
26296	"	S L Fowler	Canaan	"	"
26297	"	C H Bragden	Biddeford	"	"
26316	"	J M Andrews	"	"	"
26336	Biotite Granite	Day & Otis	Waldborough	"	"
26335	Muscovite Biotite gr	Hollowell Granite Co	2½ m w Hallowell	"	"
26336	"	"	"	"	"
26371	Biotite Gneiss	J H Plummer	4 m n e Chesterville	"	"
26383	Biotite Muscovite gr	Me Central R R Co	North Jay	"	"
26430	Biotite Granite	H Cripps	Brunswick	"	"
26185	"	Oak Hill Granite Co	Swanville	"	"
26486	Biotite Mus Gneiss	J P Glidden	Jefferson	"	"
26507	Biotite Granite	J F Gordon	1¼ m e e Wayne	"	"
26766	"	Me Red Granite Co	Red Beach	"	"
27084	Hornb'de Bio. Gran.	Jewell "	Lincoln	Jewell Granite Co	"
26211	Mus. Biotite Gneiss	Beach Grove "	Lincolnville	J E Wolff	"
27035	Biotite Granite	Mt Waldo " Works	Frankport	"	"
27036	"	" "	"	"	"
27178	Hornblende Granite	C. J. Hall	Otter Creek	C J Hall	"
26072	Diabase	H B Nash	Addison	J E Wolff	"
26417	Eleolite Syenite		Litchfield	"	"
26566	Biotite Gneiss	C H Barrell	3½ m s Turner	"	"
27025	Olivene Diabase	Pleasant River Granite Co	6 m s e Addison Point	"	"

MASSACHUSETTS.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25578	Biotite Granite	Fall River Granite	Freetown	N S Shaler	Archaean
25579	"	W. T. Cleveland	Brockton	W G Chase	"
25594	"	S B Cortiss	Randolph	N S Shaler	"
25604	Hornblend Granite	F J Fuller & Co	West Quincy	"	"
25608	"	O T Rogers & Co	" "	"	"
25606	"	Barker & Son	Quincy	"	"
25610	"	Wendell & Co	"	"	"
25611	"	"	"	"	"
25616	"	Field & Wild	"	"	"
25617	"	C Wilson	West Quincy	"	"
26757	"	Putnam & Linneham	Peabody	"	"
25902	Biotite Mus. Granite	S P Litchfield	Fitchburg	"	"
26010	Biotite Gneiss	W N Flint & Co	Monson	"	"
26011	Muscovite Gneiss	"	"	"	"
25029	"	Lemson & Woodbury	Charlton	"	"
26044	Biotite Gneiss	Bassett & Lyons	Northfield	W M Davis	"
26018	Epidote Granite		Dedham	Centennial Com.	"
26071	Biotite Gneiss	S L Ward	Lowell	W G Chase	"
26081	Mag. Limestone	Briggs & Co	Sheffield	C H Hitchcock	Cambro-Silurian
17428	Limestone		Alford	Centennial Com.	"
26082	"	H S Fitch	"	C H Hitchcock	"
26108	Muscovite Gneiss	McClellan & Goodwin	Becket	"	Lawrentian
26193	Sandstone	S J Billings	Long Meadow	W M Davis	Triassic
26194	Biotite Gneiss	S Fowler Jr	Northbridge	"	Archaean
26399	" Granite	L M Allen	Clinton	W G Chase	"
26400	" "	S L Kittridge	Leominster	"	"
26434	Micaceous Diabase	Medford	Medford	J E Wolff	L. Silurian
26435	Biotite Granite	J G Cloyes	Farmingham	W G Chase	Archaean
26436	"	"	"	"	"
26439	Soapstone	Kimball, Osgood & Co	Dana	J E Wolff	"
26440	Mus. Bio. Granite	G D Webb	Worchester	"	"
26436	" Gneiss	A Fletcher	Westford	W G Chase	"

MASSACHUSETTS—*Continued.*

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR	FORMATION
[illegible]	Muscovite Granite	Wm Reed	Westford	W O Chase	Archaean
[illegible]		H Reed			"
[illegible]	Hornblende granite	Cape Ann Granite Co	Gloucester	J E Wolff	"
[illegible]					"
[illegible]		Lanesville Granite Co			"
[illegible]		Pigeon Hill Co	Rockport		"
[illegible]	Hornblende-Biotite granite	Rockport Co			"
[illegible]		Lanesville Co			"
[illegible]	Diabase	B Fitzgerald	Somerville		"
[illegible]	Muscovite-biotite gneiss	I Mathias	West Amherst	W O Chase	"
[illegible]	Hornblende granite	J D Wilson	Wyoming	"	"
[illegible]	Conglomerate	Conn. Mason	Dorchester		L. Silurian?
[illegible]	Biotite Granite	Norcross Bros	2 m n e Milford	J E Wolff	Archaean
[illegible]		Vinco & Son	North Easton	W O Chase	"
[illegible]	Mag. Limestone		Lee	J Stillman	L. Silurian
[illegible]	Serpentine		Springfield		Archaean
[illegible]	"		Newburyport	Centennial Com	"

MICHIGAN.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR	FORMATION
[illegible]	Limestone	F Sibley	Sibley's Station	A B Conover	Devonian
[illegible]	"	F Natch's	Kaleidville	"	
[illegible]	Granite	F L Lasley	2 m n Vulcan		Archaean
[illegible]	Sandstone	L'Anse Co	Near L'Anse	J & F Hatchen	Potsdam
[illegible]	"		"	"	"
[illegible]	"		L'Anse	"	"
[illegible]	"	Watson & Palmer	Marquette	"	"
[illegible]	"	Michigan Stone Co	Stony Point	"	Waverly

MINNESOTA

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR	FORMATION
[illegible]	Hornblende Granite	I Hemlee	Sauk Rapids	N H Winchell	Archaean
[illegible]	" Mica Granite	Sauloppaugh & Bros	Watab	"	"
[illegible]	Granite		"	"	"
[illegible]	Siliceous Dolomite	Foley & Hoseck	Minneapolis	"	Trenton
[illegible]	Sil Mag Limestone	Jas Bastes	"	"	"
[illegible]		A le Dahl	"	"	
[illegible]	Dolomite	I W Babcock	Kasota	"	L. Magnesian
[illegible]		Green Young & Co	"	"	"
[illegible]	Hornblende Granite		East St. Cloud	"	Archaean
[illegible]			"	"	"
[illegible]			"	"	"
[illegible]	Mag. Limestone		St. Paul	"	Trenton
[illegible]	Sil Mag Limestone	W Dawson	"	"	"
[illegible]	Diabase		Duluth	"	Cupriferous
[illegible]		C H Root	"	"	"
[illegible]	Sandstone	J G McDonald	Fond du Lac	"	"
[illegible]		M Doyle	"	"	"
[illegible]	Granite		4 m below Beaver Bay	"	"
[illegible]		Wieland Bros	"	"	
[illegible]	Sandstone	St Paul & Duluth R R	Hinckley	"	Potsdam
[illegible]	Dolomite	Hersey Staples & Wells	Stillwater	"	L. Magnesian
[illegible]			"		"
[illegible]					"
[illegible]	Sandstone	P Ripps	Jordan	"	"
[illegible]			"		"
[illegible]	Quartzite	F Mogerling's	Courtland		Potsdam
[illegible]	Siliceous Dolomite	H Hooks F Manley C Ihrig	Mantorville		Galena
[illegible]	Mag Limestone	W W Sweeney	Red Wing		L. Magnesian
[illegible]	Dolomite	O L Hoyalind's	"		
[illegible]		G A Carlson	"		
[illegible]		C W Foster's	Winona		
[illegible]	Sandstone	Brown & Hinckley	Dakota		St Croix
[illegible]	Calcareous Dolomite	C Fleming	Cannon City		Trenton
[illegible]	Limestone	"	"		"
[illegible]	Siliceous Dolomite	Lindersmith & Son	Clinton Falls		"
[illegible]	Sandstone	Steele & McIntyre	Mankato		St Peters
[illegible]		J V Fontaine	Dresbach		St Croix
[illegible]			Luverne		Potsdam

MISSISSIPPI.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR	FORMATION
[illegible]	Limestone		Tishomingo Co		
[illegible]	Sandstone		"		
[illegible]			"		
[illegible]	Mag. Limestone		Rankin Co		Tertiary
[illegible]	Sandstone		"		

MONTANA.

NO.	NAME	QUARRY	LOCALITY.	COLLECTOR	FORMATION
27088	Dolomite		Lewis & Clarke Co	Geo McMurtrey	
27089	Mag. Limestone		"	Chas Rumley	

MISSOURI.

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	Limestone	Jas Dowling	Kansas City	G C Broadhead	Up Coal Measures
[illegible]	Mag Limestone	J Bauman	E of Kansas City	"	"
[illegible]	Cal Sandstone	Pickle Bros	2 m fr Warrensburgh	"	L Coal Measures
[illegible]	Limestone	Russell	Boonville	"	L. Carboniferous
[illegible]	Cal Sandstone	Pfeiffer & Co	1½ m n w Rockville	"	
[illegible]	Sandstone (Upper)	H Brown & Co	Rockville	"	
[illegible]		Gebhart	Clinton	"	Up Coal Measures
[illegible]		City of Nevada	Nevada	"	
[illegible]		Curry's	Near Butler	"	
[illegible]	Siliceous Dolomite	J C Gloss	1½ m e Hermann	"	
[illegible]	Limestone	City	Hannibal	"	
[illegible]	Sil Fer Dolomite	Jones	Jones Station	"	
[illegible]	Sil Limestone	J Poland	4 m e Meadville	"	
[illegible]	Sandstone	R T Kingsbury	Bluff Arrow Rock Road	"	
[illegible]	Limestone	Hannibal Lime Co	Bear Creek	"	
[illegible]	"	Robinson's	Paris	"	
[illegible]	Sandstone	Collins	1½ m e Brownsville	"	
[illegible]	Limestone	Glencoe Lime Co	3 m n Glencoe	"	Trenton
[illegible]		J Gillies	Glencoe Branch	"	
[illegible]	Cal Sandstone	White Rock Quarry Co	1½ m n w Miami Station	"	Coal Measures
[illegible]	Granite	P Schneider	Iron Mountain	"	Archaean
[illegible]	Limestone	M Dettlinger	Cape Girardeau	"	Trenton
[illegible]	Sandstone	B Richardson	4 m s w St Genevieve	"	L. Carboniferous
[illegible]	Dolomite	P F Kniel	City of St Louis		L. Part St L limest
[illegible]	Limestone	Reinfeld & Markham			
[illegible]		J McKenna			
[illegible]	Dolomite	G Ryerman			St Chester
[illegible]		St Louis Stone Co	Canton		L Carboniferous
[illegible]		L H Schowingath	Batavia	L H Schowingath	
[illegible]	Sil Limestone	Eureka	Sweetland	J & F Hatchen	Waverly ?
[illegible]	Sil Dolomite	Frontier	Near De Soto	G C Broadhead	Calciferous ?
[illegible]	"	G Malcom	1½ m e Rolla		Calciferous
[illegible]	"	Powell's	2½ m s e Pleasant Hill		Up Coal Measures

NEVADA

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	Andesite	Fulton	2 m w Reno	Wm Frazer	
[illegible]	Sandstone	Carson	Carson City		
[illegible]	Andesite	J Bennett	3 m s Virginia City		
[illegible]					

NEBRASKA

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	Limestone	Rose & Bullock	Dora	U S Treasury Dept	Permian

NEW MEXICO

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	Sandstone	Santa Fe	Near Santa Fe	Jas Stevenson	
[illegible]			Las Vegas Hot Springs	J & F Hatchen	

NEW HAMPSHIRE

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	Biotite Granite	Amoskeag Co	Manchester	Amoskeag Co	All Archaean Eruptive Archaean
[illegible]	Biotite Mus Granite	H Welles		C H Hitchcock	Archaean
[illegible]	Biotite Granite	A Redwell & Bros		"	Eruptive Archaean
[illegible]	Biotite Mus Granite	Putney & Snelling	West Concord	"	Erup into M'talban
[illegible]		Crowley & Quinn		"	
[illegible]		G A Rowell			
[illegible]		F H Sargent	Concord	Francis Hodgman	
[illegible]		Hadley & Hoyt		Hadley & Hoyt	
[illegible]		Granite Railway Co		C H Hitchcock	
[illegible]		Concord Granite Co			
[illegible]		A Hollis		Abijah Hollis	
[illegible]		Peterborough Granite wks	Peterborough	C H Hitchcock	
[illegible]	Biotite Granite	Kittredge Carlton	Milford	Kittredge Carlton	Erupt in Archaean
[illegible]		T King	"	Thomas King	
[illegible]		E Hutchinson		Emmett Hutchinson	
[illegible]		N Merrill		Nathan Merrill	
[illegible]		H F Parker		Hon F Parker	
[illegible]		Walker's	Mason	C H Hitchcock	
[illegible]		Alex McDonald			
[illegible]		Jas Maxwell		Jas Maxwell	
[illegible]	Biotite Mus Granite	D R Emerson	Rumney	C H Hitchcock	Erup in Montalban
[illegible]		G M Woodward	Troy	"	"
[illegible]		L Whittemore	"	"	"
[illegible]	Porphyry Dike		Franconia	"	Possibly Eruptive Paleozoic
[illegible]	Biotite Epidote gr	Chas Freeman	Lebanon	"	Archaean (Both Un
[illegible]		F H Frost & Son	"	"	"
[illegible]	" Muscovite gr	Chas A Bailey	Allentown	"	Erup. in Montalban
[illegible]	" Gneiss	H H Reed	Fitzwilliam	"	"
[illegible]	" Mus Gneiss	A Hayden	"	"	"
[illegible]	" " Granite	J E Fisher	"	"	"
[illegible]	Biotite Granite	A F Royce	Raymond	"	
[illegible]	" "	Chas E Boyce	Sunapee	"	Erup in Montalban
[illegible]	Biotite Mus Granite		Marlborough	"	"

NEW JERSEY.

NO.	NAME.	QUARRY	LOCALITY.	COLLECTOR.	FORMATION.
26197	Diabase	Jas Kelton	Jersey City	John C Smock	Triassic trap
26199	"	M Moore	Weehawken	"	"
26200	"	D Hoff	W New York	"	
26392	Sandstone	J B I Robinson	Belleville	"	Triassic
26395	"	Wm J Joyce	"	"	"
26728	"	A Phillips & Son	"	"	"
26259	"	"	"	"	"
26400	"		"	"	"
26254	"	Newark Quarry Co	Newark	"	"
26253	"	Kocher Bros	"	"	"
26580	"	Wm P Hartley	Paterson	"	"
26587	"	E Bolgin	Near Denville	"	Potsdam Sandstone
6679	Limestone	Rose Crystal Co	"	"	Archaean
26738	Sandstone	F W Shrump	West Orange	"	Triassic
26739	"	Wm E Bartle & Bro	Martinsville	"	"
26740	"	Jas Bell & Co	Orange Mountain	"	"
26768	"	S Clark	Milford	R A Cook	"
26769	"	Peter Bost	Stockton	"	"
26770	"	Jas Silery	"	"	"
26771	Trap Diabase	Geo Bancroft	Lambertville	"	
26971	"	"	"	"	
26990	Sandstone	L Clark & Bro	Greensburg	"	Triassic
26891	"	Chas Keeler & Son	"	"	"
26942	"	Thos Jewell	Princeton	"	"
26846	Conglomerate	"	5 m fr May's Landing	John C Smock	Quartenary
26913	Dolomite	Newton Quarries	Newton	"	Calciferous
26956	Granite		Near Morristown	"	Archaean
26957	Conglomerate		"	"	Drift
26551	Gneiss	D L & W R R Co	Dover	"	Archaean
26052	Conglomerate		Boonton	"	Drift
26589	Cal. Dolomite	J J Gordon	Near Montville	"	Archaean
26613	Sandstone	J C & R Stanley	Little Falls	"	Triassic
26614	"	"	"	"	"
26615	"	"	"	"	"
26616	"	"	"	"	"

NEW YORK.

17318	Mag. Limestone		Willsborough Point	Centennial Com	Chazy
26129		Lake Champlain Co	"	Geo H Cook	Cal. Sandstone
25011	Dolomite		Sing Sing	Col Clark	T C Metamorphic
25626	Sandstone	Robinson & Loop	Roxbury	Geo H Cook	Catskill
25627	"	B B Boughton's	"	"	"
25628	"	Grant Bros	Margaretville	"	"
25639	"	Jamieson Bros	Snider Hollow	"	"
25640	"	Delemater & Bouse	Phoenicia	"	"
5641	"	J McGrath's	"	"	"
25670	"	Lane & Co	Cold Brook Hollow	"	"
25671	"	H Boice	Boiceville	"	"
25677	"	Cornish & Rowe	Broadhead Bridge	"	"
25673	"	W Davis	"	"	"
25704	"	Sweeney's	Stony Hollow	"	Hamilton
25758	"	N Wolven's	Woodstock	"	"
25759	"	Leahey & Co	Hallihan's Hill	"	"
25760	"	Green & Co	Highwoods	"	Catskill
25761	"	L Lawson	West Hurley	"	"
25813	"	B Dunn	"	"	"
25762	"	John Woods	E shore Otsego Lake	John C Smock	Hamilton
25763	Mag. Limestone	McCabe's	Springfield Center	"	Up. Helderberg
25841	"	Howe's Cave Association	Howes Cave	"	Lower Helderberg
26149	"	"	"	"	"
25844	Sandstone	D Henderson	Saw Kill	Geo H Cook	Hamilton
25843	"	J Scully	Morgan Hill	"	"
25809	Mag. Limestone	Reilly & Scanlon	Cobbler Kill	John C Smock	Up. Helderberg
25826	Sandstone	Mason & Mack	Quarryville	Geo H Cook	Hamilton
258 8	"	Peter Daly & Co	"	"	"
26046	"	Jenkins White	Fort Ann	C H Hitchcock	Potsdam Sandstone
26074	Limestone	F W Jones	Greenport	"	L Helderberg
26075	Sandstone	Up. Aqueduct Quarry Co	Schenectady	Geo H Cook	Hudson River
16089	Mag. Limestone	Prince Wings	Near Saratoga	"	Trenton
26310	"	T Reynolds & Co	South Glens Falls	"	"
6123	"	F Clark	Near Crowne Point	"	Calciferous ?
26151	Sandstone	E Udell's	Near Reedsville	"	Hamilton group
26238	Mag. Limestone	Jas Griswold's	Amsterdam	"	Birdseye & Trenton
26239	"	D C & N Hewitt's	"	"	"
26240	"	Chas Shafer	Canajoharie	"	Calciferous
26367	"	Gouverneur & Whitney Co	Gouverneur	"	Archaean ?
50948	"	" Marble Co	Near Gouverneur	Gouv. Marble Co	"
26277	Sandstone	Potsdam	Near Potsdam	Geo H Cook	Potsdam
26278	"	Jas Finnegan	Hammond	"	"
16479	Mag. Limestone	Oren Fish	Three Mile Bay	"	Trenton
26280	Sandstone	Nathan Beebe	Camden	"	Medina Sand
26310	Mag. Limestone	Z Brown	Schoharie	"	L. Helderberg
26129	"	E T Thomas	Near Prescot	R A Cook	Trenton
26354	"	J Connors	Fairmont	Geo A Cook	Up. Helderberg
26372	"	Hughes Bros & Co	Onondaga	"	"

NEW YORK.—*Continued.*

NO.	NAME.	QUARRY	LOCALITY.	COLLECTOR.	COLLECTOR.
26389	"	Goodrich & Son	Auburn	Geo H Cook	Up. Heldberg
26402	"	A B Miles	Union Springs	"	"
26413	Dolomite	Tuckahoe Co	Tuckahoe	H W Lindsley	Archaean ? (Met.)
26415	"	J M Masterton's	"	"	"
26430	Mag. Limestone	L Thomas	Waterloo	Geo H Cook	Up Helderqerg
26432	Sandstone	J J Fuller	7 m from Liberty	John C Smock	Catskill
26454	Dolomite	J B Pike	Rochester	R A Cook	Niagara
26488	Hornblend Gneiss	Sackett's	Glenville and Tarrytown	H W Lindsley	Archaean
26495	Sandstone	G Brady's	Albion	R A Cook	Medina
26498	"	A J Squires	Hulberton	"	"
26515	"	O'Brien & O Reilly	"	"	"
26506	Dolomite	E A Preston	South Dover	H W Lindsley	Met (Arch ?)
26511	Mag. Limestone	L D Howell	Le Roy	R A Cook	Up. Helderberg
26512	Cal. Dolomite	R & J Carpenter	Lockport	"	Niagara
26517	Sandstone	Chas Whitmore	"	"	Medina
26518	"	A J McCormick	Medina	"	"
26519	"	P Horan	"	"	"
26520	"	"	"	"	"
26591	Biotite Gneiss	Munson & Co	1 m s Hastings	H W Lindsley	Hudson River Met.
26594	Dolomite	Snow Flake Co	Pleasantville	"	Met. ? (Archaean)
26600	Sandstone	Nelson Puff	Near Nyack	John C Smock	Triassic
26617	Mag. Limestone	Noon & Madden	Kingstown	Luke Noon	Up. Helderberg
26618	Sandstone	West Brookville	Near West Brookville	John C Smock	Hamilton
26621	Mag. Limestone	J B Young	Buffalo	R A Cook	Up. Helderberg
26633	Limestone	W Foglesdonger	Williamsville	"	"
26650	Argillaceous Sandst	Morris & Son	Warsaw	L S Morris	Portage
26651	Sandstone	Milo Cook	Olean	R A Cook	Lower Carb.
26671	Mag. Limestone	Burlington M'f'g Co	Near Plattsburg	John C Smock	Chazy
26672	Ophiolite	"	Port Henry	"	Archaean
26712	Sandstone	L Field	Corning	R A Cook	Chemung
26744	"	McClume	Ithaca	"	Portage
26745	"	C O Ogden	Covert	"	Hamilton ?
26749	"	John Lang	Belfast	"	Chemung
26750	"	L W Smith	Guilford Center	"	Oneonta (Catskill)
26751	"	Mrs W W Davis	"	"	"
26760	"	Dumont & Cusic	Trumansburg	W B Dumont	Chemung
26761	"	W Wagenes	Pulteney	R A Cook	
26766	"	L Orr	Oneonta	"	Oneonta (Catskill)
26826	Limestone	Sandy Hills	Sandy Hill	Geo H Cook	Calciferous
26924	"		Chazy	Geo & R. L. Barney	Chazy
26988	"	L H Carter	Lowville	L H Carter	Trenton
27050	Gneiss	Copeland	Suffern	John C Smock	Archaean
27531	Biotite Granite	A C King	Garrison	A K King	"

NORTH CAROLINA.

10770	Quartz Porphyry		Charlotte	Wm F York	
27594	Biotite Granite		Lexington	C H Scott	Archaean
27600	"		Louisburg	W C Kerr	"
27601	Granite		4 m s Salisbury	"	"
27615	Biotite Granite	J J Bassinge	"	"	"
27616	"	"	2 m s "	"	"
27621	Biotite Gneiss		Henderson	"	"
27619	Granite		Concone	"	"
27625	Shell Limestone	French Bros	Rocky Point	"	
27627	Biotite Granite	P Linehan	Potenot	"	Archaean
27628	"		Greensboro	C H Scott	"
27632	Steatite		4½ m from Greensburg	W C Kerr	"
27646	Biotite Granite	J C Hargrave	Mooresville	"	"
27647	Granite	McNeely & McPherson	"	"	"
27653	Biotite Granite	Hick & Lobdell	Buck Horn Falls	"	"
27658	Limestone	T Young	Valley Town	"	
27659	"	Garrett Estate	Red Marble Gap	"	
28118	Soapstone	J Hardin's	Ball Mountain	J R Colvard	Archaean
28142	Limestone		Cherokee county		
25652	Sandstone		Near Morrisville	Gift of the County	
30853	Soapstone		Wyatt's Mill	"	
27654	Steatite	L T Leatherwood	7 m n e Murphy	W C Kerr	Archaean

OHIO.

25021	Sandstone		Amherst	Col. Clark	L Carb (Berea grit)
25394	"	Halderman & Son	"	Edward Orton	" "
25472	"	Amherst Stone Co	"	"	" "
25706	"	Washington & Sons	"	"	" "
25268	Dolomite	Young & Christman	Eaton	"	Niagara
25264	Siliceous Dolomite	T J Smith	New Paris	"	"
25281	Sandstone	S Wagner	Monclova	"	L Helderberg
25284	"	Wm Perrin	Norwalk	"	L Carb. (Berea grit)
25293	Arenaceous Dol	Jas Mowatt	Springfield	"	Niagara
25294	Bit. Mag. Limestone	Altman & Pressel	Findlay	"	"
25296	Bit. Dolomite	D W Happersett	4½ m n Urbana	"	Watertime (L Held)
25311	Sandstone	Jas Coyle	Newark	"	Waverly
25316	"	Chas Daugherty	5 m e Newark	"	"
25318	"		Newark	"	"

Ohio—Continued.

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	[illegible]	G Hillery	Near [illegible]	Edward Orton	Waverly
[illegible]		Lockington	Lockington		L Carb. (Cuy. shale)
[illegible]	Mag. Dolomite	Wight & Armentrout	1 m from Lima		L. Held (Waterlime)
[illegible]	Limestone	Kelley & Hanley	Near Columbus		Up. Helderberg
[illegible]	Sandstone	[illegible] & Foster			Berea grit
[illegible]	Mag. Limestone	W P Brandon	Near Greenfield		Niagara
[illegible]	Sandstone	J Wagner	Berlin	"	Waverly (Berea grit)
[illegible]		Forest City Stone Co		"	Waverly (Bed shale)
[illegible]		M Forrest Bros		"	
[illegible]		Maxwell Malone		"	
[illegible]		J Worley	Elyria	"	Waverly; Berea grit
[illegible]		McDonald & Berea Co	Berea	"	
[illegible]		H Hafferty	3 m e of Berea	"	
[illegible]		J J Brewell	Wilson	"	
[illegible]		Capp & Kings	Windham	"	
[illegible]		J Fairchild	1½ m s Mt. Vernon	"	Wav. (Logan group)
[illegible]		W A Bell	East Cleveland	"	Wav. Bedford shale
[illegible]		Jos Haynes		"	
[illegible]		W H Lamps	Near Millersburg	"	Carb. Conglomerate
[illegible]		W m Tracy	W of Millersburg	"	
[illegible]		W H Capps	Hopkins	"	Wav. (Bedford shale)
[illegible]		Bedford Stone Co	Bedford	"	Wav. (Berea grit)
[illegible]		J Martin	Brownhelm	"	
[illegible]		Walhouse & Co	Near Massillon	"	Carb. Conglomerate
[illegible]					
[illegible]		H C Banks	Ridgeville	"	Wav. (Berea grit)
[illegible]		Wilson & Hughes	Independence	"	
[illegible]		J H Hurst		"	
[illegible]		G W M Smith	Near Carrollton	"	Coal M. Mah. sand
[illegible]		Jos Wright	Akron	"	Carb. Conglomerate
[illegible]	Mag. Dolomite	J Postlewait	Near Columbus grove	"	Water Lime (L. Hld)
[illegible]	Sandstone	Waltsell Bros	Logan	"	Waverly
[illegible]		Elias Hummel	Lancaster	"	
[illegible]		Sharp & Clark		"	
[illegible]		Hoovey & Brown	North Hampton	"	?
[illegible]		Walnut Grove Stone Co	Warwick	"	Carb. Conglomerate
[illegible]		A Nuttall	Near New Philadelphia	"	L Coal Measure
[illegible]		Youngsmann Co	Near Canal Dover	"	
[illegible]		Geo Rine	Wooster	"	Wav. (Logan Group
[illegible]		T Ellison	Mansfield	"	
[illegible]		S Shively	Milton Township	"	
[illegible]		S W Pattie	Plymouth	"	Wav. (Berea grit)
[illegible]		Wm S Pasley		"	"
[illegible]		Geo Graham	Greenfield	"	"
[illegible]		M Timmy	Near Coshocton	"	L Coal Measures
[illegible]		Zanesville Stone Co	Lancaster	"	Wav. (Berea grit)
[illegible]		C N Townsend	Zanesville	"	Carb. Conglomerate
[illegible]		John Foster	North Bloomfield	"	Wav. (Berea grit)
[illegible]		Grant Bros	[illegible]	"	
[illegible]		J J McClaren	3 m s [illegible]	"	
[illegible]		Samuel Dare	Cambridge	"	Coal Measures
[illegible]		Jos Hutchinson	Lewis Mills	"	
[illegible]		W J McClain's	Bellaire	"	Coal Meas (Mah. s)
[illegible]		J H Robinson	Near Bellaire	"	"
[illegible]		Archer & Beal's	Steubenville	"	"
[illegible]			"	"	"
[illegible]		Klotz & Bros		"	"
[illegible]	Mag. Limestone	A Knisert	Bloomville	"	Up. Helderberg ?
[illegible]	Sandstone	Worthington & Son	Brownhelm	"	Wav. (Berea grit)
[illegible]		Rollo & Co	1 m w Portsmouth	"	(Cuy. shale)
[illegible]				"	"
[illegible]		Rockville Freestone Co	Rockville	"	"
[illegible]		Buena Vista Co	Buena Vista	"	"
[illegible]		J M Mueller's	"	"	"
[illegible]		Hays & Jones	Piketon	"	" (Berea grit)
[illegible]		Waverly Brownstone		"	" (Cuy shale)
[illegible]		J H & Moss	Near New Lisbon	"	Coal M. (Mah sand
[illegible]		Thos Clements	2½ m s w Youngstown	"	Carb. Conglomerate
[illegible]		J Hudson	"	"	"
[illegible]	[illegible]	Geo T Irwin	Sandusky	"	Up. Helderberg
[illegible]		W Hubbard	"	"	"
[illegible]	Mag. Dolomite	A Clark	"	"	"
[illegible]	Dolomite	M Kelley & Co	Kelley's Island	"	"
[illegible]		Miss P Palmer	1 m n e Van Wert	"	L. Held (Waterlime)
[illegible]	Sandstone	D B Caulder	1½ m s w Marietta	"	Up Coal Measures
[illegible]		Constitution Stone Work	4 m s w Marietta	"	"
[illegible]	Dolomite	Angel, Miller & Co	Bellefontaine	Samuel Angels	Up. Helderberg
[illegible]	Mag. Limestone	W H Huston	5 m s Dayton	W H Huston	Niagara
[illegible]	Sandstone	C B Gaylord	Near Sunbury	Edward Orton	Wav. (Berea grit)
[illegible]	"	G Fermeter	Tyrrelburgh	"	Carb. Conglomerate
[illegible]	"	O Finch	3 m s w Marietta	"	Up. Coal Measures
[illegible]	"	B Briggs	4 m s w Marietta	"	"

OREGON.

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	Sandstone	Wm. Young	4 m from Clackamas	N Lambert	

Oregon—Continued.

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	"	Frank Wood	3 m from Albany	Frank Wood	
[illegible]	Diabase		2 m e Albany		

PENNSYLVANIA.

NO.	NAME	QUARRY	LOCALITY	COLLECTOR	FORMATION
[illegible]	Sandstone	Wm Nelson	Near Monongahela City	Wm Nelson	Carb. Coal M.
[illegible]	"		Near Webster	Chas Allen	"
[illegible]	"	Richie & McGinnis	Homewood	"	"
[illegible]	"	Reed & Ewing	Kiskiminetas Station	"	"
[illegible]	"	J G Gallagher	Baden	"	"
[illegible]	"	Hummelstown Co.	Goldsboro		Triassic
[illegible]	Diabase	Northern Central R R Co.	2½ m s of Goldsboro	Thos Kelly	"
[illegible]	Sandstone	J Beiling	1½ m w of Goldsboro	"	"
[illegible]		Hummelstown Co	1 m s Hummelstown	Chas Allen	"
[illegible]	Diabase	J Kollers	Colmar Station	"	"
[illegible]	Argillaceous Sandst	U S Government	Stoops Ferry	"	Carb. (Coal M.)
[illegible]	Sandstone	Hartman & Bernard	Near Beaver Falls	"	"
[illegible]	Biotite Gneiss	Jos H Ward	1½ m n e of n e of Chester	"	Archæan
[illegible]	Mus. Biotite Gneiss	Leiper & Lewis	1½ m s of Chester	"	"
[illegible]		A G & I O Deshong Jr	Near Chester	"	"
[illegible]	Serpentine	Jos H Hoston	West Chester	J S F Batchen	"
[illegible]	Hornblend Gneiss	Foster & Shelmire	Germantown	Chas Allen	"
[illegible]	Muscovite Gneiss	John Nolan	"		"
[illegible]	Limestone	Brownville Co.	King of Prussia	"	Calciferous
[illegible]	Hornblende Gneiss	McKinney	Rittenhousetown	"	Archæan
[illegible]	Biotite Gneiss	Barbour, Ireland & Fauntier	Frankfort	"	"
[illegible]	Cal. Dolomite	H H Witmer	Leaman Place Station	"	Calciferous
[illegible]	Sandstone	Frank Sanger	Leboeuf	Frank Sanger	Chemung W av Berea
[illegible]		Jas Leach	4 m e Erie	F W Sperr	Portage
[illegible]	Dolomite	Geo & I A Smith	Easton	Chas Allen	Calciferous
[illegible]	Sandstone	Thos Rourke	Pittsburg	Thos Kelly	Carb. (Coal M.)
25770	"	Hallam Bros	3 m s of Washington		"
25771	"	D Haggerty	5 m w of "		"
25772	"	B Mabell	Meadville	F W Sperr	"
25773	"	Amy & Knappenberger	Greenville		"
25774	"	P Leach	"		"
[illegible]	"	C Herrmann	Sharon	"	L. Productive Coal
[illegible]	"	Jacob Friday	Wampum	"	Carb. (Coal M
[illegible]	"	A Manderson	Center Bridge	A Manderson	Triassic
[illegible]	"	"	"	"	"
[illegible]	"	"	"	"	"
[illegible]	"	"	"	"	"
[illegible]	"	John Cook	Near Canonsburgh	Thos Kelly	Carb. (Coal M.)
[illegible]	"	L W Odell	Stoneboro	F W Sperr	"
[illegible]	"	David Ready	Rockwood	"	"
[illegible]	"	D Breman	Titusville	"	L Carb.
[illegible]	"		Mauch Chunk	Chas A Ashburner	Carb. (Coal M.)
[illegible]	"		"	"	"
[illegible]	"	Lamn & Leary	Garland	F W Sperr	"
[illegible]	"	J M Colgrove	Corry	"	L. Carboniferous
[illegible]	"	J A Hoffman	Lucesco	Thos Kelly	Carb. (Coal M.
[illegible]	"	Loyalhanna Co.	Derry Station	"	"
[illegible]	"	J C Campbell	"	"	"
25915	"	Allegheny Val. R R Co.	Iowa Station	F W Sperr	"
[illegible]	"	Cambria Iron Co	Prospect	"	"
[illegible]	Quartzite	Del., Lack., & W. R R	½ m e Shickshinny	Chas Allen	"
[illegible]	Sandstone	Geo Nicely	Shickshinny	"	"
[illegible]	"	S Zimmerman	Greensburg	Thos Kelly	"
[illegible]	"	J McNally	Queens Run	F W Sperr	Catskill
[illegible]	"	H F Hawk & Co.	Farrandsville	Chas Allen	Chemung
[illegible]	"	Pinneo Estates	2 m n Danville	"	Clinton Group
[illegible]	"	C Shibeley	Connellsville	Thos Kelly	Carb. (Coal M.)
[illegible]	Limestone	A R Banning	"	"	L Carboniferous
[illegible]	Sandstone	Speer Whitesand Co.	2½ m s e Connellsville	"	Carb. (Coal M.)
[illegible]	"	P Bradley	Antrim	F W Sperr	"
[illegible]	"	Mainesburgh Co.	Mainesburgh	"	Chemung
[illegible]	"	D Shipley	4 m s e Uniontown	Thos Kelly	L Carboniferous
[illegible]	"	Speer Whitesand Co.	Layton Station	"	Carb. (Coal M.)
[illegible]	"	Porter Bros.	Fayette Station	"	"
[illegible]	"	J McAdams	Somerset	"	"
[illegible]	"	Wm Myer	2 m n w Altoona	"	L Carboniferous
26162	Mag. Limestone	A G Morris	Morrell	"	L Silurian
26170	Limestone	F Hetright	5 m W Huntingdon	"	U Silurian ?
[illegible]	Mag. Limestone	J T Shirley	Cove Station	"	Devonian
[illegible]	Dolomite	D Grove & Son	Near Orbisonia	"	U Silurian
[illegible]	Limestone	R Henderson's	Near Spruce Creek	"	L Silurian
[illegible]	"	Chas H Smith	Near York	"	"
26257	Cal. Dolomite	C F Winter	"	"	"
26261	Diabase	D T Pittenturf	2½ m s Gettysburg	"	Triassic Trap
26272	Cal. Dolomite	W F Noble	Carlisle	"	Trenton
[illegible]	"	H Lippy	Chambersburg	"	"
[illegible]	"	Kerr, Weltzel & Co.	Wrightsville	"	Siluro-Cambria
[illegible]	Sandstone	Louis Fiam	N Morristown	"	Triassic
26467	Diabase		Reading	E V D'Invilliers	" ?
26470	Gneiss		"	"	Archæan
26471	Quartzite		"	"	Potsdam

PENNSYLVANIA—*Continued.*

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
26472	Diorite		3½ m e Reading	E V D'Invellier	Archaean
26473	Quartzite		Gaudin Hill Jacksonwall	"	Potsdam
26523	"	W Smith	4 m n w Warren	J F Carll	Carb. (Coal M.)
27015	"	C W Maxwell & Co	Pond Eddy	Thos. Kelly	Catskill
27016	"	Harmony Brick Co	Brandt	"	Chemung
27017	"	J Williams	3 m n Scranton	"	L Carb.
27018	"	"	"	"	Catskill
27019	"	Olyphant	Olyphant	"	Coal Measure
27020	"	M Shield & Son	1 m w Nicholson	"	Chemung
27033	"	A R Fordyce & Co	Skinner's Eddy	"	"
27087	"	Brownscombe & King	Meshappen	"	"
27089	"	Phillip Bauder	Pinins	"	Coal Measure
26465	Cal. Conglomerate		1 m w Amityville	E V D'Invellier	Triassic
			IRHODE ISLAND.		
25490	Biotite Granite	Smith Granite Co	Near Westerly	N S Shaler	Archaean
25491	"	"	"	"	"
25492	"	"	"	"	"
25510	"	New England Granite Co	"	"	"
25511	"	"	"	"	"
25512	"	"	"	"	"
25528	"	C P Chapman	"	"	"
25529	"	"	"	"	"
25530	"	"	"	"	"
25513	"	Horace Vaughn's	West Greenwich	"	"
25514	"	Joseph Tarbox	"	"	"
25531	"	Smithfield Granite Co	4 m e Smithfield	"	"
25533	Hornblende	Diamond Hill Granite Co	Cumberland Township	"	"
25652	Biotite Granite	A G Cromb	Niantic	"	"
			SCOTLAND.		
27349	Sandstone	Cross Hill	Near Aaan	J S F Batchen	
26890	"	Brora	Near Brora	"	
			SOUTH CAROLINA.		
37578	Biotite Granite		Winsboro		Archaean
37582	"		Columbia		"
37583	"		Charleston	E R White	"
37584	"		Batesburg Co		"
37585	"		Aiken Co		"
37601	"		"		"
37586	"		Edgefield Co		"
37587	"		Fairfield Co		"
37588	"		"		"
37589	"		Newburg Co		"
37590	Soapstone		Spartenburg		" ?
37591	Blue Marble				
			TENNESSEE.		
25930	Limestone	John Hasson	Rogersville	Henry E Colton	L Silurian
26172	"	Fulkerson & Chesnutt	"	"	"
26211	"	Chesnutt & Chesnutt	"		"
26851	"	Jas Price	Near Rogersville	Jas. Price	"
26806	"	Jas Wright	"	Jas. Wright	"
25938	"		Near Nashville	Henry E Colton	"
25932	"	Vanderbilt	"	"	Hudson river
25933	"	"	"	"	L Silurian
26078	"		"	A Gattinger	"
25939	Oolitic	Swan's	Sherwood Station	Henry E Colton	
25934	"	Burris	5 m from Springfield	"	Niagara
25944	Limestone	M Carriger	Near Morristown	"	
25935	"	Joe Stamp	7 m from Whitesburg	"	L Silurian
26299	"	John M Ross	Knoxville	"	"
26210	"	Thomas & Co	"	"	"
26658	"	Knoxville Marble Co	4 m from Knoxville	"	Trenton
26657	"	"	"	Geo. W Ross	"
24656	"	Crescent	Knoxville	J W S Frierson	L Silurian
27637	"	"	"	"	"
26970	"		3 m Knoxville	John M Ross	"
26778	Conglomerate		Wolf Creek	A Gattinger	
26784		Mrs Nichols	Lebanon Pike	"	L Silurian
26785		Treben's Farm	Carters Creek	"	
26787			"	"	
26786		Mrs Breans		"	
26788			Murfreesboro	"	L Silurian
26789		"Old" Quarries	Nolensville Pike	"	"
26905	Limestone		"	"	"
26790			Hiwassee Copper Mines	"	Archaean
26802	Conglomerate		Ocoee river	"	
26803	Sandstone		Parksville	"	

TENNESSEE—*Continued.*

NO	NAME	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
26966	Sandstone		Ducktown	"	
27186	Limestone		11th Dis. Davidson Co.	"	L Silurian
27187	"		25th Dis. "	"	"
26787	"		Charlotte Pike	"	
			TEXAS.		
25713	Limestone	G W Brackenridge	2 m w Austin	Judge Joseph Lee	
25714	Mag. Limestone	J Sheehan	8 m e "	"	
25716	Limestone	John McDonald	1 m w "	"	
25725	"		10 m above Austin	"	
26363	"		Austin	W S Treasury Dept	
25701	Sandstone		Riverside	J S F Batchen	
25717	"		10 m s w Burnet	Judge Joseph Lee	
25718	"		"	"	
25719	Limestone		5 m s w "	"	
25720	"	Holland's	3 m s "	"	
25721	Biotite Granite		8 m fr "	"	
25724	Sandstone		Near Mormon Mills	"	
25726	Fer. Dolomite	Dr A Gregg	3½ m s e San Saba	"	
25919	Sandstone	Searcy & Hubbard	Ranger	"	
			UTAH.		
25351	Hornblende Bio. gra		31 m s Salt Lake City	Wm. Foster	Archaean
25352	Limestone		San Pete Valley	"	"
25356	"		Payson	"	"
25453	Mag. Limestone		"	"	"
25395	Sandstone		Red Butte	"	Triassic
25400	"		"	"	"
			VERMONT.		
17418	Mag. Limestone		Isle LaMotte Com	Centennial Com	Black river
26187	"	Ira & J P Hall	"	C H Hitchcock	"
26188	"	"	"	"	"
26189	"	"	"	"	"
20673	"	Burlington M'f'g Co	"	John C Smock	"
20676	Limestone	Fiske & Barney	"	Geo & R L Barney	Chazy
20928	Mag. Limestone	Geo & R L Barney	Swanton	"	L Potsdam
26923	Dolomite	"	"	"	"
17401	"		Mallette Bay	Centennial Com	"
17502	Soapstone		Grafton	"	Huronian
25581	Biotite Granite	J Ainsworth & Son	Near Woodberry	C H Hitchcock	?
25582	"	C W Cillery	"	"	?
26617	"	"	"	"	?
25580	Limestone	Brandon Marble Co	Brandon	"	Cambro Silurian
25692	Mag Limestone	Geo E Hall	Pittsford	"	"
26574	"	F M Smith & Co	"	"	"
26575	"	"	"	"	"
26576	"	"	"	"	"
26577	"	"	"	"	"
25710	Crystalline	Columbia Marble Co	Rutland	"	"
25730	Limestone	Rutland Marble Co	"	"	"
25731	"	"	"	"	"
25732	"	Sutherland Falls Marble Co	"	"	"
26892	" (2 spec.)	Esperanza Marble Co	"	Esperanza Mar. Co	"
25728	"	Sheldon & Sons	"	C H Hitchcock	"
25729	"	"	West Rutland	"	"
25735	"	Gibson & Woodfin	"	"	"
26502	"	Sherman & Gleason	"	"	"
26183	Biotite Mus. Gran.	R W Laird	Ryegate	"	Up. Silurian
26487	"	R F Carter	"	"	"
26274	Limestone	S F Prince	Dorset	C H Hitchcock	L Silurian (?)
25734	"	S F Prince & Co	"	S F Prince & Co	"
26275	Mag. Limestone	D L Kent & Co	East Dorset	C H Hitchcock	"
26026	Steatite	Berole	Townshend	Sp'g'f'd Soapstone Co	
26707	Crys. Limestone	Wm W Kelly	South Wallingford	W W Kelley	"
26708	"	"	"	"	"
25566	Mus. Granite	E Kittridge	Bethel	C H Hitchcock	
25584	Biotite Granite	Whitmore & Morse	Barre	"	Up Silurian
25585	"	E L Smith	"	"	"
25586	"	G W Mann	"	"	"
27024	Mag Limestone	Cutter Marble Co	New Haven	"	"
			VIRGINIA.		
25254	Soapstone	Jas E Neale	Near Langley	Jas E Neal	
26263	Biotite Mus. Granite	K J Leyburn	" Fredericksburgh	J C Huntington	Archaean
25269	Biotite Granite	J B Mitchell & Co	Tuckahoe District	"	"
25270	"	Richmond Granite Co	Near Richmond	"	"
25271	" (2 spec.)	Westham "	Manchester	"	"
25272	"	Old Dominion "	Granite	"	"
25273	"	Mayfield	Mamozine District	"	

VIRGINIA—*Continued.*

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25341	Diabase	Fauquier	Near Catlett's Station	"	Triassic?
25491		Coral Marble Co	Craigsville	"	Up Silurian
25482		"	"	"	"
25598		Craig	"	"	"
25763	Diabase	T W Edwards	3 m from Leesburgh	Thos W Edwards	Triassic
26318	"	East Bend	3 m e	"	"
27073	Cal Dolomite	Loudoun County Company	Loudoun Co	J S Palmer	
27130	Gypsum		Saltville	Centennial Com	
27240	Sandstone	Mayfield Co	Manassas	R A Hooe	

WEST VIRGINIA.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25850	Sandstone	Schulz & Lotz	Wheeling	Thos Kelly	U. Coal Measures.
25849	"	Grafton	1 m e Grafton	Edward Orton	
26150		Sullivan & Peat	Rowlesburg	"	Catskill
26391	"	Coal Branch	½ m from Charleston	"	Barren Coal Meas.
26361	"	Pole Cat	Parkersburg	B F Bacon	

WISCONSIN.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25864		C Geiger	6 m from Fond du Lac	A D Conover	Niagara?
25883	Limestone	Berry & Bannister	Taycheedah Township	"	"
25881	Dolomite	Marblehead Lime Co	½ m fr. Eden Sta	"	"
25885	"	Nash Bros & Co	"	"	"
25896	"	Frank Last	½ m s w Oshkosh	"	Trenton Salice
25887		Schneider & Frank	2 m	"	"
25940	"	U S Government	1 m n Kaukauna	"	Trenton
25941	"	Kaukauna Water Power Co.	Ledyard	"	Galena
25942		Reuben Scott	2½ m fr. Menasha	"	Trenton or Galena
25944	Limestone	P McGrath	Neenah	"	"
25945	Dolomite	John Neilson	3 m e La Crosse	"	Calciferous
26464	"	Magnus Neilson	3 m s e	"	"
26702	Granite		Black River Falls	"	Archaean
26703	Sandstone		½ m n Ableman	"	Potsdam
26910	Granite	Montello Granite Co	Montello	"	
26913	Sandstone	J Edwards & Co	Grand Rapids	"	Potsdam
26920	"	J N Avery's	Stevens' Point	"	"
26922	Granite	Jacob Kolter's	Wausau	"	Archaean
26983	Dolomite	Lewis Miller & Co	6 m w Manitowac	"	Niagara
26879	Sandstone	C W Potter's	1 m s Manston	"	
26940	Dolomite	H E Roth	Sheboygan	"	Niagara
27064		Mereden's	Prairie du Chien	"	Calciferous
27151	Quartzite	Wis. & Chicago Co	3½ m w Waterloo	"	Huronian
27155	Limestone	C Fox & Sons	2½ m w Racine	"	Niagara
27176	Dolomite	Waupun	Waupun	John A McCune	Galena-Trenton
26921	Granite	J Kolter's	Wausau	A D Conover	Archaean

WYOMING.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25558	Granite	G Griffith	Dale Creek	Wm Foster	Archaean

WASHINGTON TERRITORY.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
26248	Sandstone	C Seidel & Co	Bellingham Bay	N Lambert	Carboniferous
26861	"	"	Whatcom	C Seidel	Carboniferous

MAINE.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25651	Slate	Monson Pond Slate Co	Monson	J K Wolff	
25819	"	Dirigo Slate Co	"	"	
25632	"	Adams H Merrill	Brownsville	"	

MARYLAND.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
26092	Slate	Maryland Slate Co	Ijamsville	Chas E Munroe	

MINNESOTA.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25488	Slate		Near Knife Falls	N H Winchell	Huronian

NEW YORK.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25945	Slate	Albany Slate Co	Middle Granville	C H Hitchcock	Hudson River
25966	"	D Williams & Bro	Hampton	J E Wolff	
26975	"	Boston & New York Co	"	C H Hitchcock	
26051	"	Salem Slate Co	Salem	"	

PENNSYLVANIA.

NO.	NAME.	QUARRY.	LOCALITY	COLLECTOR.	FORMATION.
25740	Slate	David Williams	Slatington	Chas Allen	
26912	"	Kurtz & Jacob	"	D D Jones	
26913	"	Jas Hess & Co	"		

PENNSYLVANIA—*Continued.*

NO.	NAME.	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
25920	Slate	Chapman's N. Y. Slate Co	Chapman's Sta	Chas Allen	
25949	"	Peach Bottom M'f'g Co	Bangor	"	
25959	"	Locher Slate Co	Slatedale	"	
25993	"	N Peach Bottom Slate Co	6 m n w Catasauqua	"	

VERMONT.

NO.	NAME.	QUARRY.	LOCALITY.	COLLECTOR.	FORMATION.
25808	Slate	Eagle Slate Co	Castleton	C H Hitchcock	Referred to Cambrian by some authors and to Hudson River by others.
25809	"	"	"	"	
25814	"	Richard Conway	"	"	
25816	"	Lake Shore Co	"	"	
25817	"	Evergreen Slate Co	Poultney	"	
25853	"	Lloyd, Owens & Co.	"	"	
25855	"	Globe Slate Co	"	"	
25908	"	Griffith & Nathaniel	"	"	
25915	"	Griffith, Owen & Co.	Fair Haven	"	
26011	"	J S Warren	Pawlet	"	
26014	"	Brownell Slate & Flag'ng Co	West Pawlet	"	
26016	"	Sisting & Nelson	"	"	
26047	"	Owen Evans & Son	"	"	
26048	"	H Dillingham	"	"	
26161	"	Tyler Johnson	5 m fr. Brattleboro	"	Cambrian

THE WASHINGTON MONUMENT.

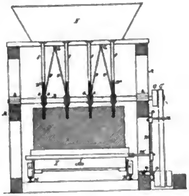
Great care is taken to note the movements of the Washington monument, for it does move. The law of contraction and expansion of material by heat and cold operates here as well as elsewhere. When the sun shines full on the eastern face in the morning the stones on that side expand and throw the shaft slightly to the west. Then the sun goes around to the south and the apex of the monument makes a corresponding swing to the north. As the orb creeps about the sky to its final setting in the evening, the glittering point on the top of the monument makes a contra-movement around half a circle, gradually settling back to its normal position after the rays of the sun have lost their power. This movement has never been calculated, but is undoubtedly very slight. The wind, too, has an effect upon the structure. From the center of gravity of the shaft, located 174 feet and 10 inches from the floor, is a cross-beam from which is suspended a fine steel wire, protected by a galvanized iron tube about four inches in diameter. This hangs to the floor at the northwest corner of the elevator well. At the bottom is a plumb-bob weighing 25 pounds, suspended by means of the wire, and hanging in water. An iron cylinder protects the instrument from injury, and a little iron house 4 feet high keeps off the draught. Through the cylinder is a telescopic eye-piece, in one end of which are two vertical wires about one-quarter of an inch apart. When a candle is held at an opening in the side of the box and the eye is applied to the outside end of the tube, the plumb line can be seen—a fine line between the vertical marks. Any movement in the shaft is recorded by a corresponding movement in the line. When the structure is at rest, and in its normal position, the line hangs still, midway between the others, but when the shaft is disturbed by the action of the wind it sways back and forth like the pendulum of a clock, always coming to rest in the center. This is observed every day, and if the custodian should ever notice the line hanging still at any point outside of the two cross lines he will then know that the monument has been permanently moved from its level position. Until then, however, no one need be alarmed by the oscillations of the shaft from the action of the wind or the influence of the sun.

STONE is a new monthly publication in the interest of the stone and marble trades. We have received two copies, No. 1 and No. 5, and from what we can see of it we can recommend it to the trade as a very useful publication.—*Granite Cutters' Journal.*

RECENT PATENTS.

ISSUE OF SEPTEMBER 25, 1888.

No. 390,034—Machine for Sawing Stone. James Peckover, Philadelphia, Pa. Filed April 26, 1888.



CLAIM.—1. The combination of a stone-carrier, a saw-carrier having a series of saws of different diameters mounted in line, one in advance of another, means for moving one of said carriers in respect to the other, and sand-feeders discharging into the kerf in advance of each saw of the series, all substantially as specified.

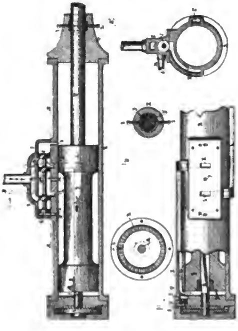
2. The combination, in a sectional circular saw, of a series of segments having dovetailed notches in their edges, with double dovetailed keys fitting in said notches, said keys being thicker than the blade of the saw, all substantially as and for the purpose set forth.

3. The combination of the saw-carrying frame having a series of saws of different diameters, stopping and starting mechanism for each saw-spindle and a controlling-arm projecting into the path of the stone-carrier whereby as one carrier is traversed in respect to the other the saw will be successively set in motion, substantially as set forth.

ISSUE OF OCTOBER 2, 1888.

No. 390,578—Steam Rock-Drill. Thomas F. Farrell, Paterson, N. J. Filed March 8, 1888.

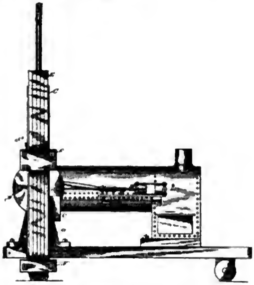
CLAIM.—1. The combination, with the cylinder, the piston, the valve-heads G H I J, and the valve-chest, of the ducts N O, the outlet P, and the two ports K L, extending, respectively, along the opposite sides of the cylinder, with their inner end portions extending beyond or past each other and opening into the chest, substantially as shown and described.



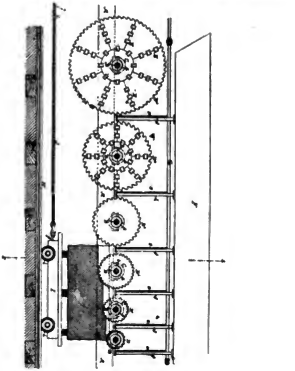
2. The combination, with the cylinder, the piston, the valve, the steam-chest, and ports communicating with the chest and cylinder, of a screw extending into and engaging the piston and having a toothed wheel, R, and a detent moved by the pressure of steam from the piston-cylinder to lock and hold the toothed wheel stationary as the piston moves in one direction and relieved of steam pressure to release the wheel when the piston moves in the opposite direction, substantially as described.

ISSUE OF OCTOBER 16, 1888.

No. 391,260. Stone-Channeling Machine. Thomas McDonnell, Jr., Cockeysville, Md. Filed April 23, 1888.



CLAIM.—1.—In a stone-channeling machine, the combination, with the frame and the standard-guides, of the crank-shaft having disks thereon, wrist-pins eccentrically arranged upon said disks, head-blocks connected to said wrist-pins, pitmen sliding within the head-blocks, and drills, substantially as herein shown and described.



2. In a stone-channeling machine, the combination, with the horizontal shaft having disks upon the outer ends thereof, wrist-pins formed upon said disks, of the head-blocks engaging with said wrist-pins and having slots therein through which the pitmen work, and the sliding blocks for

raising and lowering the drills, substantially as herein shown and described.

3. In a stone-channeling machine of the kind herein shown and described the combination, with the engine, piston, shaft, disks having wrists-pins formed thereon, and the head-blocks working upon said wrist-pins, of the pitmen having movable collars upon their upper ends and lower portions thereof, and spiral springs interposed on the pitmen between said collars and the head-blocks in connection with the sliding blocks, substantially as and for the purpose set forth.

4. In a stone channeling machine, the combination, with the drill-clamps and the disks, of the head-blocks mounted on said disks, the pitmen working in said head-blocks, and spiral springs arranged on the pitmen above and below the head-blocks, substantially as herein shown and described.

5. In a stone-channeling machine, in combination with the drill-lifting mechanism, the sliding blocks D′ and D, having their outer faces recessed to receive a gang of drills having diagonal serrations on their outer faces, and the drill-clamping plates having inner diagonal serrations meshing with the serrations on the drills, thereby holding the latter in rigid position, said clamping-plates being bolted to the sliding blocks, substantially as herein shown and described.

6. In a stone-channeling machine, the combination, with the lifting mechanism herein described, of the means for adding impetus to the downward movement of the drills, consisting of the springs *e* connected at their lower ends with the head-blocks D′ and at their upper ends with the blocks *o*′, in connection with the retaining rod *o* substantially as and for the purpose set forth.

7. In a stone-channeling machine, the combination with the machinery herein described, of the screw-threaded rod *o*, working in the block *o*″, standard-guides C, recessed blocks *o*′, spring *e*, sliding blocks D′, and drills, as and for the purpose herein set forth.

8. In a stone-channeling machine, the combination of the frame A, shaft B, having disks B′, the wrist-pins *b*, eccentrically secured on said disks, the head-blocks G, pitmen H, sliding clamps D and D′, drills supported in said clamps, the spring J, J′, and *e*, and the standard-guides, substantially as herein shown, and for the purpose described.

THE FIRST STONE.

A recent lecture by Prof. Bonney, on the "Foundation Stones of the Earth's Crust," before the British Association, was illustrated by real sections of rock, so thin as to be partially transparent, which were projected on the screen. The conclusion at which the lecturer finally arrived was that gneisses and schists are the oldest minerals known to us, and are, therefore, to be regarded as the foundation stones of the earth's crust.

PRESERVATIVE FOR STONE.

Soapstone incorporated with oil, after the manner of a paint, is said to be superior to any kind of paint as a preservative. Soapstone is to be had in an exceedingly fine powder, mixes readily with prepared oils for paint use, covers well surfaces of iron, steel, or stone, and is an effectual remedy against rust. It has been known to protect some stonework, such as obelisks, in China, for ages past.

TOUCHING THEIR TASTES.

They were discussing the magazines. "That was a fine portrait of Lester Wallack in *Scribner's*, Miss Brown," said he.

"Indeed, yes. And how interesting the *Century* bric-a-brac was last month," said she.

"Wasn't it. And how good the last chapters of 'Annie Kilburn' are," said he.

"I haven't read them," said she.

"Aren't you fond of serials?" said he.

"Not very; I don't mind rice, but I despise oatmeal. Why do you ask," said she.

And he said "Good evening, Miss Brown."—*New York Sun.*

A LITTLE OUT ON THE MIRACLE.

A Spanish priest who had the care of a small school was relating to his pupils the miracle of "feeding the multitude," but by an unlucky chance he reversed the numbers, and told the class that five thousand loaves had been eaten by five men.

"And did the men burst, padre?" eagerly asked a sharp little ten-year-old, delighted at the idea of having for once caught his teacher in a mistake.

"No, my son," replied the ready-witted priest, recollecting himself just in time; "that was where the miracle came in."

SUBDUING BY KINDNESS.

The minister had often heard that kindness would subdue the fiercest beast. "Aha," he said, "I'll try that game on you."

And so he kindly, gently called: "Come rammy, rammy, ram; to see the folks abuse you so I grieved and sorry am."

The ram quite dropped its humble air, and rose from off its feet, and when the parson landed, he was behind the hindmost seat.

As he shot out the door and closed it with a slam, he named a California town—I think it was "Yuba Dam."

THIS STYLE SHOULD BE PATENTED.

Isaacson—"You gomplain because dhose pants haf shrunk a leedle?"

Bowwowy—"A little? De tings are like tights, sure!"

Isaacson—"Vy, dot was de peauty of my clodhings; dey vas loose und easy in de summer, but dhey grow closer und comfordable vhen de cold vedder comes on. Ain'd you got any style apoud you anyvay?"

HIS TRUSTFUL WAYS.

"George, don't!" exclaimed she. "You are altogether too much like the Anthracite Coal Trust."

"Think so, my dear?"

"Yes. The nearer the Winter season draws nigh the tighter you squeeze."

CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT.	STRUCTURE	COST.
New York City	T Schappert	J C Burne	18 Flat buildings	$360,000
New York City.	Chas Buck & Co	Chas Buck & Co.	Flat building	175,000
New York City.	W H Stafford	Henry Davidson	Residence	100,000
New York City.	L A Grant	J Kastner	Factory	15,000
New York City.	R H Wolfe & Co	Buchman & Deisler	Workshop	10,000
New York City.	Charles Smith	Fred Ebeling	Factory	25,000
New York City.	J J Astor	G A Schellinger	Warehouse	17,000
New York City.	D Richey	G A Schellinger	Flat building	18,000
New York City.	Hugh Brady	E Wenz	Flat building	67,000
New York City.	E Johnston	A B Ogden & Son	Flat	35,000
New York City.	F E Smith	F C Merry	Flat	125,000
New York City	Thos McQuerry	A Fouler	Flat	16,000
New York City.	A L Outwater	Outwater & Felter	Residences	20,000
New York City.	James Douglas	B Sillman, Yonkers, N. Y.	Residence	15,000
New York City.	23d-st. R R Co	H J Hardenburg	Depot	30,000
New York City.	John Brown	C P H Gilbert	Residence	13,000
New York City.	Elizabeth Johnson	A B Ogden & Son	Flat Building	18,000
New York City.	J A Crothers	E L Angell	Double Flat Building	72,000
New Yerk City.	T J Jenkins	C M Walgrove	Flat Building	54,000
New York City.	T Schappert	Architect Burne	Store and Flat	18,000
Chicago, Ill.	F H O'Connor	Ostling Bros.	Flat	18,000
Chicago	Alex McIntosh	R G Pentecost	Apartment Building	75,000
Chicago	Mrs Gilvoe	Lutken & Thisslew	Store and Flat	10,000
Chicago	John Siger	“	Store and Flat	12,000
Chicago	A S Newberry	Thos. Hawkes	Store and Warehouse	25,000
Chicago	E T Darby	“	Apartment Building	150,000
Chicago	John Stack	Lutken & Thisslew	Residence	18,000
Chicago	Barry Bros	W D Cowles	Dwelling	15,000
Chicago		Wilson, Marble & Lamson	Residence	32,000
Chicago		“	Residence	75,000
Chicago		“	Residence	30,000
Chicago		J J Kouhn	Hotel	250,000
Chicago		“	Apartment Building	100,000
Chicago	Geo Rowe	J H Huber	Store and Flat	10,000
Brooklyn, N. Y.	Jenkins & Gillies	E F Gaylor	Flat	10,000
Brooklyn, N. Y.	B Conklin	B C Hubert	Residence	15,000
Brooklyn, N. Y.	James Shea	G L Morse	Business Block	18,000
Memphis Tenn.	The City	Carrington Mason	Library	75,000
Detroit Mich.	Henry Harry Walker	Mason & Rice	Residence	25,000
Detroit Mich.	Saml G Caskey	Rogers & McFarlane	Residence	10,000
Kalamazoo Mich.	E Woodbury	Williams, Otter & Dexter, Dayton O.	Residence	15,000
Boston Mass.	Wm Austin		Residence	30,000
Philadelphia Pa.	Mary Herold	John J Deery	Store and office building	12,000
Cincinnati, O.	Ches & Ohio R R Co	Chief Engineer	Freight house	25,000
Washington D. C.	Albert Cary		Brewhouse	17,000
Washington D. C.	James D Waugh	Mr. Schneider	Residence	20,000
Kansas City	Allen Moynihan	Herman Probst	Ten Residences	120,000
Kansas City	J Barnett	J O Hogg	Residence	16,000
Kansas City	The City		Jail	50,000
Kansas City	Colored Masons		Temple	200,000
Kansas City	Jackson County		Court-house	750,000
Niagara Falls, N. Y.	R D Porter		Hotel	25,000
Rock Island Ill.	Y. M. C. A.	Edw S Hammatt	Building	25,000
Brockville Ont.	Thomas Tompkins	Geo A Allan	Hall and office building	20,000
Bridgeport Conn.	Y. M. C. A.		Building	50,000
Kissimee Fla.	Florida Sugar Co	John J Deery	Storage-house	10,000
Salina	K. of P.		Hall	28,000
Sioux City Ia.	Stock Exchange	Architect Loft	Building	70,000
Massillon O.	Company F	H L Manlo, Canton O	Armory	20,000
Greensburg Pa.		E A Curtis	Church	20,000
Decatur Ill.	United Presbyterians	Williams, Otter & Dexter, Dayton O.	Church	35,000
Buffalo N. Y.	St Columbia's Catholic Society		Church	35,000
Alameda Cal	Christ Episcopal Church		Church	12,000
Omaha Neb.	First M E Church		Church	100,000
Davenport Ia	Calvary Baptists		Church	25,000
New Albany Ind	Trinity M E Church Society	M A Weir	Church	20,000
Fayetteville N. Y.	School Board	E A Curtis, Fredonia N. Y.	School-house	20,000
Nashville Tenn.	T L Herbert		Residence	15,000
Cincinnati O	Geo Fox	Williams, Otter & Dexter	Residence	10,000
McKeesport Pa.	Versailles Cemetery Board		House and Gateway	50,000
Osterville Mass.		Franz E Zerrahn, Boston	Residence	[illegible]
Montpelier, Vt.	The City		Mon. to Gen. Stannard	[illegible]
Fall River Mass.	Fall River Iron Works Co		Mill	[illegible]
Whitehall N. Y.	Miller & Phelps		Mill	75,000
Buffalo N. Y.	John Eckhardt	L Saenger	Store and F.	15,000
West Bay City Mich.	Capt Davidson		Mill	35,000
Ogden Utah	R Robinson		Residence	10,000
Monticello Minn.	Thomas Lowry		Residence	15,000
Laramie Wyo.	M C Brown	W E Ware	Residence	12,000
Muskegon Mich.	St Mary's Church Society	John Grady, Grand Rapids	Church	30,000

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT.	STRUCTURE.	C O
Chicago, Ill.	Robert Thacker	Robt. Rae	Residence	$ 15,000
Chicago, Ill.		Snyder & Quiner	Apartment Building	18,000
Chicago, Ill.	Capt G Gunderson	G Isaacson	Flat Building	10,000
Chicago, Ill.	Chas A Hale	W Lesher	Residence	10,000
Chicago, Ill.	Frank Thacker	Robt. Rae	"	20,000
Chicago, Ill.	Dr. Morrison	Robt. Rae	"	15,000
Detroit, Mich.	Dexter M Ferry	Dexter M Ferry	"	75,000
Detroit	Syndicate	Geo. H Edbrooke, Chicago	Office Building	150,000
Detroit	James McMillan	Mason & Rice	Block of Flats	30,000
Boston, Mass.		J A Hasty	Residence	12,000
Boston	West End Land Co	Peabody & Stearns	"	20,000
St. Louis, Mich.	Col Elwell		"	15,000
Grand Rapids, Mich.	H N Hovey	Architect Hopkins	"	15,000
Bald Hill Cliff, Me.	Geo N. Conarre, Philadelphia, Pa.		"	10,000
Sea Girt, N. J.	Chas B Wright	Benj. Linfoot, Philadelphia, Pa.	"	18,000
Springfield, Ill	Little & Crafton	Bullard & Bullard	"	10,000
Findlay, O.	Wm Bell		"	10,000
Wichita, Kan.	Bryon Fruit Co	Gile & Olston	Building	10,000
Ft. Wayne, Ind,	Ryan Bros	H W Matson	Livery Stable	10,000
Washington, Pa.	S P Fergus	J T Burke	Residence	20,000
Hazleton, Pa.	State of Pennsylvania	Benj. Linfoot	Miners' Hospital	60,000
Pittsburgh, Pa.	Builders' Exchange		Building	200,000
Lincoln, Neb.	Board of Trade		Block	100,000
Summerville, S. Ca.	Charleston Hotel & Imp. Co		Hotel	200,000
Morris, Minn.	Judson, Hancock & Co		"	20,000
Davenport, Ia.	Calvary Baptists		Church	25,000
Reading, Pa.	The Leeperites		"	10,000
Wilmington. Del.		H Ashton Huey	"	25,000
Buffalo, N. Y.	First Presbyterians	Green & Wicks	"	35,000
Buffalo, N. Y.	Black Rock Polish Church Society	Clark & Goetz	"	100,000
Ithaca, N. Y.	Cornell University		Laboratory Building	80,000
Georgtown, D. C.	Georgetown College	J H Richards	Building	15,000
Brooklyn, N. Y.	Board of Education	J W Naughton	School-house	63,000
Hutchinson, Kan.	N K Fairbank & Co	T H Noble	Factory	50,000
Topeka, Kan.	The County		Court-house	300,000
Lowell, Mass.	The City	Warren L. Floyd	Engine-house	12,000
Buffalo, N. Y.	The City	O Connor	Building	90,000
Norton, Kan.		Geo. McDonald	Court-house	26,000
Lenox, Mass.	Wm. D Sloane		Residence	10,000
Cleveland, O.	Police Department	Lehman & Smith	Police Station	35,000
San Angello, Tex.	W Willis Estate of Galveston		Block Stone Buildings	
Rusk, Tex.	The City	M J Whitman	Court-house	
Atlanta Ga.	Masons	Dr. W A Love	Temple	100,000
Lowell, Mass.	The City		Armory	90,000
Worcester, Mass.	The City		"	125,000
Hartford, Conn.	John C Mead		Amusement Hall	30,000
Le Sueur. Minn.			German College	12,000
Meadville, Pa.		Prof. Hurdekoper	Industrial Home	20,000
Buffalo, N. Y.	Masonic Society		Temple	125,000
Winston, N. Ca.	Y. M. C. A.	James A Gray	Building	20,000
Grand Rapids, Mich.	Y. M. C. A.	Harvey J Hollister	"	75,000
Deadwood, Dak.	The City		Hall	20,000
Fall River, Mass.	The City		Court-house	170,000
Oneida, N. Y.	St. Patrick's Church Society	M H Hubbard, Utica	Parsonage	14,000
Peoria, Ill.	Bethel Mission	Henry Marmein	Church	30,000
Chester, Ill.			Hotel	20,000
Dalton, Mass.	Z. & W. M. Crane		"	30,000
Corpus Christi, Tex.	Board of Trade		Building	300,000
Belton, Tex.	Baylor Female College		"	25,000
Roanoke, Va.	Y. M. C. A.		"	
Nachville, Tenn.	Thos. L. Herbert		Residence	10,000
Chattanooga, Tenn.	H W Lynch		Building	9,000
Aberdeen, Miss.	The City		School-house	15,000
Washington, D. C.	C V Trott		Building	19,000
Baltimore, Md.	Brantly Memorial Church		Church	30,000
Clarksville, Ga.	A P Huston & A J Nichols		Hotel	30,000
Little Rock, Ark.	E W Kimball		Residence	10,000
Little Rock, Ark.	Masons		Temple	100,000
Little Rock, Ark.	C W Clark		Residence	9,000
Buffalo, N. Y.	Horace Stillman	F W Caulkins	Apartment Building	35,000
Buffalo, N. Y.	James Powers	Joan G Balsam	"	30,000
Anniston, Ala.			Ophans' Home	10,000
Talladega, Ala.	Y M C A		Building	10,000
Washington, D. C.	Myron M Parker		Stone Residence	40,000
Brooklyn, N. Y.	C B Sheldon	J G Glover	Apartment House	50,000
Brooklyn, N. Y.	McDurmit & Concannon	J. D Reynolds	Block	24,000
Brooklyn, N. Y.	F G Calder	W N Calder	"	22,000
Brooklyn, N. Y.	M Moran	J D Reynolds	Flat Building	10,000
Brooklyn, N. Y.	B Conklyn	B C Hubert	Apartment Building	15,000
Brooklyn, N. Y.	D Atkin	G W Busa	Store and Flat	28,000
New York City	H & J Coller	J C Burne	Flat Buildings	120,000
New York City	"	J C Burne	Store and Flat Building	50,000
New York City	A S Walker	G Robinson	Residence	20,000
New York City	F A Seith	F S Barns	Store Building	18,000
New York City	J West & B Meyer	G B Pelham	Flat Building	18,000
New York City	P Behren	A Spence	"	90,000
New York City	John H Babcock	A Spence	"	15,000

PRICE CURRENT.

ARTIFICIAL STONE.

(C A Stevens, Lansing, Mich.)

	Sq ft
Sidewalks	12½c
Building stone, plain	20 c

BLUESTONE.

(Lord & Griswold, Chicago.)

New York	45c
Wyoming Valley	45c

BLUE FLAG STONE—

(J. G. Barger, Goodyear's, Cayuga Co., N. Y.)

Prices f. o. b. Atwater, on L. V R. R. and Cayuga Lake.

Rough and Wavy Flag	Sq. ft.
2, 3 and 4-ft size	5c
5 and 6 "	6c
Split Flagging	
2 and 3-ft. size	6c
4 "	7c
5 and 6 "	8c
Smooth Split Flagging	
2 and 3 ft. size	8c
4 "	9c
5 "	10c
6 and 7 "	11c
Solid Rock, per cubic foot	50c

Platforms, 4 in. thick.	Sq. ft.
Less than 25 sq. ft.	16c
25 and less than 40 sq. ft	20c
40 " 50 "	25c
50 " 60 "	30c

Platforms containing more than 60 sq. ft, prices given on application. For platforms more than 4 in. thick, add 6c per inch for every inch over 4 inches up to 8 inches; over 8 inches thick prices given on application. Special advantages for furnisheing large platforms

For planing and jointing, per sq. ft.	25c
For planing, jointing and beading, per sq. ft.	30c

[Forest City Stone Co., Cleveland, O.]

(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches	20

Flagging—	Sup. ft
4 to 6 inches thick, natural bed, any size up to 12 ft. long	13c

EUCLID BLUE AND COLUMBIA SANDSTONE—

Sawed Flagging.	
1 in. thick	10c
2 "	10c
2½ "	12c
3 "	14c
4 "	18c

BROWNSTONE—	cu. ft
Ohio—No. 1 Promiscuous blocks	60c
No. 2 " "	50c
Ashland, Wis.—Promiscuous blocks	60c
Connecticut—No. 1 " "	85c
No 1 " "	85c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscous blocks	40
No. 2. " "	30c
No. 1. Monument Bases, broken to size	40c
No. 2. " " " "	35
Engine beds, broken to size,	40
Perch or Wall Stone, per ton railroad weight	50c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	90

NORTH RIVER BLUESTONE—

(Union Bluestone Co., New York)

Flagging	
Rough Flag, promiscuous sizes	$ 9
Smooth " "	10
2 and 2 6 Smooth Flag, 1½ in. and over	12
3 " 3.6 " under 1½ in. thick	11
3 " 3 6 " 1½ in. and over	13
Cess Pool Flag, 2 to 2.6 in. square, 3 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1½ and under 1¾ in. 2 ft. and over wide, wide	13
4 and 4 6 in. smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in.	23
5 ft. " " " 3 in.	25
5 and 5.6 Smooth Flag, 2 in. and over	17
5 and 5.6 " " under 2 in.	15
6 and 6 6 " " 2 in. and over 18	18
6 and 6 6 " " under 2 in.	16
Well Stone, 3 to 3½ in. thick, 4 to 4.6 in. square	24
Well Stone 3 to 3½ " 5 to 5.6 "	28

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag.	
6 ft. to 6.6, x 5 to 6 ft. wide	$ 22
7 ft. to 7.6, x 4 to 5 ft "	24
8 ft. to 8.6, x 4 to 6 ft. "	28

The above to be 2½ inches thick

Promiscuous Large Flag	
30 to 50 ft, 3 in. thick	28
50 to 70 "	38
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thickness at special prices.

For planing add 22 cents.

For rubbing add 35 cents

Window Sills and Lintels.	
3 x 8 in. Quarry cut	21
4 x 8 in. " "	24
5 x 8 in. " "	29

½ in. allowance in thickness.

Door Sills.

5 x 12 in. Quarry cut }
5 x 14 in. " " } 3½ cts per in. in width
5 x 16 in. " " }

8 to 10 ft. long, add 10 cts. per foot

Curb, Quarry Cut.	
Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in thick	27
14 " under 4 in. "	28
14 " 4 in.	32
16 " bev'd, under 3½, 3 ft. and over, long	31
16 in. Curb, 3½ to 4, 4 ft. and over, long	33
18 " 3½ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	55
18 in. Corners, per set	5 50
20 " "	6 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.	
12 in. gutter, 3 to 3½ in.	17
12 in. " thin	14
14 in. " 3 to 3½ in. 3 ft. and over, long	20
14 in. " thin, 2.6 and over, long	18
16 in Belgian Bridge, 4 in. thick	44
20 in. " " 4 in thick	55
24 in. " " 4 to 4½ in	65
24 in. " " 5 to 6 in	77
24 in " " 7 to 8 in	90
19 in. Bridge Flag Joints, 3½ in.	28
20 in. " " " 3½ in.	40
24 in. " " " 4 in.	50
Coping	
11 in. Coping, 2 to 3 in	22
14 " 2½ to 3 in	28
16 " 2½ and under 3½ in	40
16 " 3½ to 4 in.	45
18 " 3½ to 4 in	60

20 in. to 36 in. Coping, 4 in. thick, 3½ cents per in. in width When ordered over 4 in. thick, special price will be given.

When ordered under 4 in. thick, 3 cents per in in width

Steps.	
6 x 12 in promiscuous lengths, under 8 ft.	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft and up to 10 ft. long, add 10 cents per foot.

Rock	
Promiscuous Rock, per in in thickness	9
Dimension Rock, per in in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 Inches Thick	
Under 20 feet	30
20 feet and un der 25 feet	35
25 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price

Above, if dimension both ways, add 10 per cent.

For 5 in add 10 cts	
" 6 "	20
" 7 "	30
" 8 "	40
" 9 "	53
" 10 "	65
" 12 "	100

For planing add 25 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.	
4x8 in.	42
5x8 in.	50
5x9 in	60
5x12 in.	77

½ in allowance in thickness.

Rubbed Lintels.	
3½ to 4 x 10½ in under 8 ft	48
8 ft and under 10 ft	60
4 in. x 13 in. under 8 ft. in length	67
Rubbed Curb.	
2½ x 8 in promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in.	48
12 " " " " 4 in.	55
Rubbed Mantels.	
4 x 10 in.	56
4 x 12 in.	65
4 x 14 in.	73

Dimension lengths with heads, measure heads.

Rubbed Hearths.	
3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4.6 in. long, 1.4 to 2 ft. wide	33
" 4.6 to 5.6 " 1.4 to 2.6 in wide	40
" 5.6 to 6 6 " 1.4 to 3 ft. wide	45
" 6.6 and under 8 ft long, 2 to 4 ft. wide	65
Rubbed and Jointed Tile.—Boxed	
Under 2½ in. thick, 12 to 20 in. square, per superficial ft.	55

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed	
3 ft. and 3 ft. 6 in., 1 ft. 6 in and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 5 " 6 " 2 " "	39
6 " 6 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cemetary and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone team blocks, broken out in rough or finished, ready for setting.

Trade discounts on application

BROWNSTONE.

(Lord & Griswold, Chicago)

[All quotations f. o. b. quarry, unless otherwise mentioned]

		Cu. ft.	
Carbondale, light	70c.	f. o. b.	quarry
" dark	95	"	"
Hummelstown	45	"	"
Lake Superior { Marquette	1 00	"	Chicago
Lake Superior { Rain Drop	1 00	"	"
Trenton	50		
Linden	50		
New Brunswick	45		
Kibbie—Massachusets	65		

OHIO BROWNSTONE—

	Cu. ft.
Killbuck	45c
Grant	45c
No 1. Promiscuous blocks	45c
No. 2. " "	35

Stone ordered to dimension sizes 10 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT BROWNSTONE—

(Middlesex Quarry Co., Portland)

	Cu. ft.
Blocks, promiscuous sizes	$ 95
Blocks, No 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc , No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc , No. 2, 40 cu. ft. and over, price to be agreed upon.	
	Superficia
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft. long, promiscuous sizes	60
Platforms, Cornice, etc., 7 to 8 in. thick, under 18 superficial feet	85
Platform, Cornice, etc , 18 and under 24 superficial ft.	1 00
" " etc , 24 " " 32 " ft.	1 12
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashlar, under 4 in. thick	20
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 8 in. promiscuous lengths	63
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu ft.	1 50
" " 30 cu. ft. and over, price to be agreed upon	
Monumental Stone, 8 to 12 in. thick, charged 12 in.	
Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in thick	55

Discount 5 per cent.; cash or approved Notes, at two months

FREESTONE.

(Lord & Griswold, Chicago.)

New Brunswick brown	45c
Buena Vista	40
Ohio	30
Long meadow, brown	60

GRANITE.

(Lord & Griswold, Chicago.)

Westerly	
Monson	65c
Woodstock	65c
Mica Stone	50c
Port Deposit	60c

GREEN STONE.

(Lord & Griswold, Chicago.)

Pennsylvania	50c

LIME, CEMENT, ETC.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	60
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " 1 " " " "	35
Fire brick Savage per 100.	5 00
" " Aetna " "	4 00
" " Montezuma " "	3 50
" " West Virginia " "	3 40
Ground fire clay, best, per bushel	1 00
" " " common " "	75

Discounts
Vitrified sewer pipe, ...50 per cent.
Fine Pipe, for Chimneys........26 " "
Terre Cotta Chimney Tops........25

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f.o.b. Erie.

LIMESTONE.

(Lord & Griswold, Chicago.)

	Cu. ft.		
Salem, Bedford	25c	f. o. b.	quarry.
Oolitic, " buff	25	"	"
" " blue	35	"	"
Oolitic Bowling Green	25	"	"
Artesian	35	"	"
Grafton	35	"	"

MAGNESIAN—

(J. A. Green, Stone City Iowa.)

Dimension Stone —(First Quality of all ordinary sizes.)	
12 inches and over, per cubic foot	$ 35
11 to 12 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17
Vault covers—(Large size.)	
7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25
Flagging Stone—(Ordinary size)	
5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10
Bridge Stone.	
Common, per cubic yard	$ 2 60
Coppings, " " "	6 75
Pedestal Bases, per cubic yard	3 75
Footing Stone.	
Dimensions, per cubic yard	$ 3 25
Common, " " "	2 60
Rubble or Building Stone.	
Common Rubble, Per 100 lbs.	2½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	8
Street Crossings.	
5 to 8 inches, per superficial foot	$ 15
Curbing, 3 to 6 inches thick, per superficial ft.	15
Cut and Rubbed Stone—(Finished Ready to lay in their place.)	
Ashlars per sq. ft. measuring all that shows	$ 60
Base	70
Corner Blocks	
Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
236 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

(Lord & Griswold, Chicago.)

JOLIET ....Rubble, $6 cord; dimension 30c
Planed sidewalk, Chicago........64c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts, per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts extra per superficial foot.

Rough Stone.

Mill Blocks as quarried, per cu ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc.	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft	15c
Promiscuous good select Bridge Stone, cu ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 3 per ct., on rough and dimension, and 5 per ct. on sawed.

[Big 4 Limestone Co., New Point, Ind.]

Prices on cars at quarry, the buyer paying freights.

Flagging for Sidewalks.

	In Rough.	Jointed.	Jointed and 4-cut Hammered.
3-inch	10c	13c	20c
4 "	16c	21c	26c
5 "	17c	22c	27c
6 "	18c	24c	30c
7 "	22c	28c	34c
8 "	24c	30c	36c
9 "	26c	33c	39c
10 "	28c	36c	42c
11 "	30c	38c	44c
12 "	33c	40c	45c

2c extra when over 14 feet long or in strips less than 2 feet broad.

Platforms

	In Rough	6-cut Face. 8-cut Edges.	8-cut Face 10-cut Edges.
6-inch	22c	58c	65c
7 "	24c	58c	65c
8 "	28c	58c	65c
9 "	30c	58c	65c

Block Stone.	Cu. ft.
12 inches thick or over	——
Irregular sizes, 20x70 ft.	30c
Special sizes	33c
Bases	33c

Block stone less the 12 in. thick at Flagging Prices.

Bridge Stone.	Ton of 2,000 lbs.
First-class, dressed	$2 25
" undressed	1 30
Second-class	1 00
Coping, 12 in. thick and over	2 15

" less than 12 in. thick at flagging prices.

Building stone.	Ton of 2,000 lbs.
Riprap	$0 25
Ordinary Rubble.	50
Range Rubble (select)	1 00
Scrap Flagging	1 50

Range stone 6 to 10 in. thick, 6 to 10 in. wide, 18c lin. ft.

Jail Stone.	6-cut Hammered.
6-inch, one side dressed	34c
both sides dressed	46c
7-inch, one side dressed	38c
both sides dressed	50
8-inch, one side dressed	42c
both sides dressed	54c
9-inche, one side dressed	46c
both sides dressed	58c

Door Sills and Steps.		
6-inch, per sup. foot, in rough	Sq. ft.	20c
7 " " " "	"	25c
8 " " " "	"	30c
Ordinary dress. 6-cut edge, 4 cut face	Sup. ft.	50c
Extra dress, 6-cut edge, 6 cut face	"	55c
" 10 " 8 "	"	65c
Sawed sills of all kinds per sup. foot		——

Strips less than 16 inches wide same price per lineal foot as Sills and Steps are per superficial foot.

Culvert Covering and Footings.

Same price as Footings.

Irregular sizes, ...8 to 9 in. thick, 11c   10 to 13 in. 12c
Dimension " ....8 to 9 in. thick, 13c   10 to 12 in. 14c

Crushed Stone,

In orders for 25 cars and over........35c per ton.
" of less than 25 cars ....40c "

Invert Stone for Sewers.

9x20 in.x2 ft. radius ....95c lineal foot.
9x20 in.x3 ft. " ....90c "

Pier Stone.

Stone in rough, 25c per cubic foot.

The thickness optional with consignor.

If dressed, add to price of stone in rough for bedding and pitching face, 18c per cubic foot. For bedding and tooth axing face, 25c per foot face measure.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	16
3 " " " "	12
Lineal measure.	
Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	23
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.
10 to 12 inches thick superficial measure 12½
7 to 9 " " " " 10

The above drilled to size one way only.

Dimension Footing.
10 to 12 inches thick superficial measure 15
7 to 9 " " " " 12

Drilled to size both ways.

Bridge Stone.
$3 to $4.50........per cubic yard.

Rip-Rap.
$1 to $2 50........per car load.

MARBLE.

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial in.							Monumental
	¾	1	1¼	1½	2	3	4	
Dark Veined Blue	25	30	35	40	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	55	55	80	1 10	4 00
Ex. Dk. Veined Blue	35	40	50	60	60	90	1 20	4 50
Ex. Dk. Mottled Blue	40	45	55	70	70	1 05	1 40	5 00

Dark blue base strips and posts, per cubic foot	$1 75
Dark blue bottom bases ....per cubic foot	1 73
Dark blue bottom bases defective, per cubic foot	1 25
Dark blue markers, 0.10 to 1.2 long, 3 in. thick each	50
Dark blue markers, 0.10 to 1,2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 6 in wide, assorted sizes each.	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra ....cubic foot	50
Stripe ordered 7.0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 3 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing........per cubic foot.	20
Boxing........ " "	25

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial						Cu.
	1 in.	1¼ in.	1½ in	2 in.	3 in.	4 in.	Monumental
Statuary	90	1 15		1 35	2 00	2 70	8 50
No. 1	75	90		1 10	1 65	2 20	6 50
Average	60	70	Same as 2 inch	75	1 12	1 50	5 25
No. 2	40	45		55	72	1 10	4 25
Rutland Italian	30	35		55	82	1 10	4 25
Mottled Smith	——	——		40	60	80	3 50
Best No. 3	27	32		35	52	70	3 00
No. 3	18	22		25	37	50	3 00
Extra dark and mottled blue	40	50		60	90	1 20	4 50
Dark blue	30	35		50	75	1 00	3 50
Light blue	20	25		30	45	60	3 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in Inches.	Diam. Bowl in Inches.	Rutland Average. S. F. D. M. V. Mount Dk. No. 1	R'tl'd No. 2 ex. dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No. 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue. Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	3 45	2 35	3 40
8	4	6 95	2 85	2 75	6 65	2 55	3 65
9	5	3 15	3 05	2 95	2 85	2 75	3 75
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 80	6 60	3 40	6 30	6 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	3 90	3 70	5 50
14	6	4 80	4 50	4 20	4 00	3 80	5 70
12	7	5 15	4 85	4 55	4 35	4 15	5 75
13	7	5 35	5 05	4 75	4 55	4 35	6 25
14	7	5 65	5 25	4 95	4 65	4 45	3 50
15	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 60	6 20	3 80	5 60	7 65
15	8	7 40	3 80	6 40	3 90	5 70	7 90
16	8	7 60	7 00	6 60	3 10	5 80	8 40
18	8	8 00	7 40	6 90	6 40	6 00	8 90
16	9	8 80	8 10	7 50	7 00	6 60	9 80
17	9	9 20	8 40	7 70	7 20	6 70	10 35
18	9	9 50	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	6 00	7 90	7 40	11 80
18	10	11 35	10 85	9 45	6 75	8 15	12 75
20	10	16 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 25	13 25
24	10	13 75	12 45	11 35	10 35	9 55	15 75
18	11	13 75	12 65	11 55	10 65	3 95	15 85
20	11	14 55	13 25	12 15	11 15	10 25	15 85
22	11	15 35	13 95	12 75	11 85	10 85	13 85
24	11	16 25	14 65	13 35	16 15	11 25	17 85
18	12	15 85	14 45	13 25	13 15	11 45	16 95
20	12	16 85	15 25	13 95	13 75	11 85	1795
22	12	17 75	18 05	14 55	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 85	13 15	———
28	12	20 65	18 45	16 55	14 95	13 65	———
24	13	21 20	19 00	17 10	15 50	14 20	———
26	13	22 60	20 10	18 00	13 20	14 80	———
28	13	23 80	61 20	19 00	17 10	15 60	———
30	13	25 00	22 30	19 90	17 90	16 30	———
24	14	25 80	23 20	21 00	19 10	17 00	———
26	14	27 40	24 70	22 30	20 30	18 70	———
28	14	29 30	26 20	23 60	21 40	19 70	———
30	14	30 90	27 70	24 90	22 80	20 70	———
32	14	32 70	29 20	26 20	23 70	21 80	———

Hearths, 1 in., sawed edges, per sup. foot	$ 24
No. 3 Base stripe and posts, cubic foot	1 90
inferior No. 6 posts and stripe "	1 65
" No. 3 bottom bases "	1 65
" No. blue posts, stripe and bottom bases	2 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4 "	1 00
ootstones, 5 to 8 in., each	20
" sawed heads, each	22
" " sand rub and box	25

SUTHERLAND FALLS MARBLE—

1888	Superficial, 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental.
Mourning veins	53	66	87	92	1 28	1 84	5 40
No. 1	48	56	82	87	1 30	1 74	4 90
Average	38	49	62	67	1 06	1 34	3 90
No. 2	28	34	42	47	70	94	3 15
Best No. 3	23	29	35	37	56	64	3 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Strips and Posts, per cubic ft.	$1 90
Inferior No. 3, Posts and Strips, per cubic foot	1 65
Inferior No. 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 12 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 2 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup. ft.	24

ITALIAN MARBLE—

	Cu. ft.
Monumental stock	$4 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size.
¾ in. slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubil foot.

MOUNTAIN DARK MARBLE—

1888	Superficial, ¾ in.	1¼ in.	2 in.	3 in.	4 in.	Cu. Monumental.
No 1	3	74	1 07	1 60	2 14	5 90
Average	43	64	87	1 20	1 74	4 90
No 2	37	49	67	1 00	1 34	3 90
No. 3	25	34	50	78	1 04	2 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No. 3, Strips and Posts, per cu. ft.	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

SPECIALS—

Diminished Dies, extra........per cubic foot	50c
Strips ordered 7 ft. long and over, extra per cubic foot.	80
Sawing edges slabs, 1 inch thick per superficial ft.	03
" " " 2 " " "	06
" " " 3 " " "	09
" " " 4 " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock..........per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths..........per surface foot rubbed	05

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " " small lots,		12
Sponges	per lb.	75
Red Grit	"	05
Nova Scotia Blue Grit	"	05
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

TOOLS—

¼ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	33
Frosting Tools	per doz.	3 00
⅜ in. Granite Lettering Tools	"	2 50
½ " " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mash "	" 2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	3 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb.	each,	$ 50
3 to 5 lb.	"	75
5 to 7 lb.	"	1 25
8 lb. and up	"	1 50

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 3 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 34,000 pounds or more in one order.

Branches of Vermont Marble Co. see price list.

Toledo	40c.
Cleveland	35
Boston	50
Philadelphia	45
Detroit	49
Chicago	50
St. Louis	60

(Lord & Griswold, Chicago.)

	Cu. ft.		
Tennessee Red	$2 50@$5 00	f. o. b.	Chicago
" Knoxville	3 00	"	"
Vermont White	3 50@ 8 00	"	"
Ophite	4 50@ 5 00	"	"
Armodite	1 50	"	"

GEORGIA MARBLE—

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$6 50	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 60
Cherokee, average	2 75	3 10
No. 3 base Strips and Posts	1 50	1 95
Inferior No. 3 Posts and stripe	1 25	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	65
Markers, 18 to 18 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	23	30
Foot Stones, sawed heads, sand rubbed and boxed	25	35
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	50
Strips ordered, 9 feet long or over, extra	50	50

Urn list, sent on application.

(Columbian Marble Company.)

SAWED MARBLE—

Columbian Dark.

	per cu. ft.
Extra dark variegated	$5 00
No. 1. dark variegated	4 50
No. 1 dark mottled	4 50
No. 2 dark	3 50
Pearl blue	3 50
Inferior dark bases and stripe	1 75

Columbian light.

Light medium Cloud	$4 50
Best light cloud	3 50
No. 2 light cloud	2 50
No. 3 light cloud	2 00
Inferior light	1 25

	Per superficial foot 1 in.	1¼ in	1½ in.
Extra dark variegated	50	62	80
No. 1 dark variegated	40	55	75
No 1 dark mottled	40	55	75
Pearl blue	35	45	55
Light medium cloud.	40	55	75
Best light cloud	35	45	55
No. 2 light	25	30	35
No. 3 light	18	22	25
Hearth, sawed edges	30	—	—

Sawed marble.

	each.
Footstones, 5 to 8 inches	$ .20
Footstones, 5 to 8 inches, sawed heads	.22
Footstones, 5 to 8 inches, sawed heads, sanded and boxed	.28
Footstones, 5 to 8 inches, oval heads	.28
	per cu ft.
Diminished dies, extra	$ .50
Strips and posts, 7 feet and over, extra	.50
Sand rubbing	.35
Boxing	.25

All monumental stock will be boxed, with the exception of base strips and posts, unless otherwise ordered.

Building marble, tile and curbing. Prices given on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

	cu. ft
Extra dark veined	$4 00
Dark blue	3 50

MACHINERY.

STEAM PUMPS—

	Discount
Smedley's	25 per ct.

PULVERIZERS—

	Discount
Cyclone	20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete	$400

EXCAVATORS—

Little Giant	$4,500
Railroad Giant	6,500

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting, Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20	25.00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank.	$60.00
" 0	" " " " with "	54.00
" 1	" 21x27, " 10 with hood	40.00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 5,	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Steel "Hercules"	42½ per ct.
Steel	42½ "
Gal. Iron	35 "
Iron	35 "
Wire Rope Blocks	25 "

(Washburn & Moen M'f'g. Co.)

Iron	33⅓
Steel	37½
Gal. Iron	33⅓

BLOCKS AND TACKLE—

(Toledo Block Works.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron bushed	2 40	4 50	6 30
10 " "	3 30	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	5 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	29 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00

Wrought-iron Tackle Blocks	Single	Double	Triple
6 inch	1 40	2 25	2 75
8 "	2 40	3 50	4 50
12 "	4 55	8 10	10 40
16 "	9 55	15 70	22 00
20 "	22 00	33 40	50 00

Iron-bushed, discount 20 per cent.; roller-bushed discount 10 per cent.

(Detroit Block Works.)

Discount from list	40 per ct.

WROUGHT-IRON PIPE—

(American Tube & Iron Co.)

	Discount
Butt weld. black	55 per ct.
" " galv.	45 "
Lap " black	65 "
" " galv	65 "

BELTING-RUBBER.—

Standard	60 per ct. and 10 per ct.
X quality	50 " " 10 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	38 00

RED SANDSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	60c
Dunreith, red	60c
" variegated	35c
Darlington	40
McArthur	65
Carlisle	65
Potomac	50

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft.
No. 1 Promiscuous block	30c
No 2 " "	40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	40c
No. 2 " "	30
No. 1 Monument Bases, broken to size	45
No. 2 " " " "	35
Pier Blocks " "	20

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 6 " "	09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	25c
6 " " "	44
9 " " "	64
12 " " "	88
3 in. Berea or Blue Amherst	21
6 " " "	41
12 " " "	77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	10
2½ " "	12
3 " "	14
4 " "	16

SPLIT PLATFORMS—

	Superficial feet. 6in.	12 in.
No. 1 Buff Amherst	25c	60c
No. 2 " "	30c	50
No. 1 Berea or Blue Amherst,	20c	50
No. 2 " " "	17c	40
No. 3 " " " (for sidewalks)	12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—

	Cu. ft
Promiscuous Blocks	15c

Write for discounts, etc.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—

	Cu. ft.
No. 1	30c
No. 2	25

(French Fort Quarry, New Castle, N. B.)

Olive	40c f. o. b.

(Babbitt Sandstone Co., Ypsilanti, Mich.)

Brown Sandstone	25 f. o. b. quarry

(Lake Huron Stone Co., Detroit, Mich.)

Blue Sandstone	20c f. o. b

SLATE.

[Henry Fulmer, Easton, Pa.]

F. O. B. Slatington, Pa.

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 13 cents square foot in car lots.

ROOFING SLATE—

Size.	No. in sq.		Size.	No. in sq.	
14x24	98	$3 50	10x18	192	$2 75
13x24	106		9x18	214	
12x24	115		10x16	222	
12x22	127		9x16	247	
11x22	138		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

[Coolman & Westcott Fairhaven Vt.]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17

For rubbing both faces of above, excepting caps and trusses extra	.02
Any of the above unrubbed less	.01
Steps, to 5 ft. in length	20
Steps, 5 ft. to 8 ft. "	25
Steps larger	special
Platforms to 16 sup. ft.	20
" 16 to 22 " "	25
" 22 to 28 " "	30
" Larger	special

Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscoting, sup. ft.	20
Black Boards, ⅜ to ½ up to 3 ft. wide, crated sup. ft.	18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft	20
Black Boards, 3½ ft. to 4 ft. wide crated, " "	22
Thresholds to 5 ft in length " "	20
" 5 ft. to 8 ft. " " "	25
Curriers' Slabs, faced one side crated, " "	30
Curriers' Slabs, faced two sides, crated, " "	34
Billiard Table Beds, crated, " "	22
Imposing Stones, " "	20
Grave Covers, sawn and planed only. and in two or more pieces. " "	16
Grave Boxes, rabbeted ends, " "	20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	16
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	20
16 to 22 " "	25
22 to 28 " "	30

Vermont Red	$13 50	f. o. b. Chicago.
" Purple	5 50	" "
" Green	5 50	" "

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x15, 16x20	2 65	"
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 75	" "
Maine	5 50@5 80	" "

BLACK—

(Michigan Slate Co., Lansing,)

Michigan	$5 50 f. o. b. quarry

PURPLE ROOFING SLATE—

(Hazard Slate Company Fair Haven, Vt.)

	First.	Second
24x12	$3 75	$2
22x14	3 75	2
22x12	3 50	2 25
22x14	3 85	2 25
20x12	3 85	2 25
20x10	3 85	2 25
18x12	3 50	2 35
18x10	3 50	2 25
18x 9	3 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	3 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	2 75	2 25
14x 9	2 75	2 22
14x 8	2 75	2 25
12x10	2 50	2 25
12x 9	2 50	2 25
12x 8	2 50	2 25

TOOLS.

SHOVELS—

(Sandford, Fork & Tool Co., Terre Haute, Ind.)

20 per cent. discount 2 per cent. cash.

REAMERS—

(Knox Rock Blasting Co., Pittsburgh, Pa.)

	each
3 feet long	$3 00
6 "	5 00
9 "	6 50
12 "	8 00

TOOL STEEL—

(F. C. Brooksbank, Cleveland, O.)

Jackson's	16c per lb.

[J. H. Koippenberg, Cleveland, O.]

Stone Cutters Mallets	$12 00 Doz.

Wooden Rolls for stones 3 feet long	4	5	6	7	8	in.
	20c	35c	50c	65c	75c	each

SPECIAL NOTICES.

"For Sale" ads. will be inserted at the low rate of one cent a word, each time. Terms, cash with order.

Dealers wanting workmen, or workmen wanting situations, are requested to avail themselves of our columns to make their wants known. There will be no charge made for the service.

Write to our advertisers for their illustrated circulars, descriptive pamphlets, etc. There's a fund of information in all such printed matter, for tradesmen. And don't forget to mention in your letter that it was STONE that induced you to write.

SITUATIONS WANTED.

CUTTER OR POLISHER wants situation in the South or Southwest Address LESLIE DUMOND, West Shokan, N. Y.

GOVERNMENT PROPOSALS.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 13th day of November, 1888, for furnishing all the labor and materials and building complete 435 feet, more or less, of pile and stone breakwater for the Marine Hospital at CHICAGO, ILL., in accordance with the drawings and specification, which may be seen at this office, or the office of the superintendent, or parties desiring them will be furnished copies on receipt at this office of a postoffice money-order in amount one dollar drawn to the order of the Treasurer of the United States. The right to reject any bid is reserved. Each bid must be accompanied by a certified check for $500, drawn to the order of the Treasurer of the United States, for the faithful performance of the work

THOS D. FISTER,
Acting Supervising Architect,

Oct. 29 1888.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 20th day of November, 1888, for labor and materials required in the erection and completion of the superstructure and interior finish of the postoffice, etc., at WICHITA, KAN., in accordance with the Specification and drawings, copies of which may be seen at this office, the office of the superintendent, the Builders' Exchanges at Baltimore, Md., Cincinnati, O., Detroit, Mich., Indianapolis, Ind., Minneapolis, Minn., and Wichita, Kan., and the Builders' and Traders' Exchanges at Chicago, Ill., Kansas City, Mo., and Louisville, Ky.

Each bid must be accompanied by a certified check for $500.

The Supervising Architect will furnish a limited number of copies of the specification and drawings at seven dollars a set upon receipt of that sum in postoffice money order, drawn to the order of the Treasurer of the United States.

THOS D. FISTER,
Acting Supervising Architect.

Oct 30, 1888.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington D. C., until 2 o'clock P. M. on the 13th day of November, 1888 for the labor and materials required in the completion of the interior finish of the Court-house, Postoffice, etc., KEOKUK, IOWA, in accordance with the specification and drawings, copies of which may be seen at this office, the office of the Superintendent, the Builders' Exchange, at Baltimore, Md., Cincinnati, O., Indianapolis, Ind., Minneapolis, Minn., Builders' and Traders' Exchange at Chicago, Ill., Louisville Ky., Milwaukee, Wis., Kansas City, Mo., Mechanics', Dealers' and Lumbermens Exchange, New Orleans Louisana.

Each bid must be accompanied by a certified check for $500.

The Supervising Architect will furnish a limited number of copies of the specification and drawings at five dollars a set, upon receipt of that sum in Postoffice money order, drawn to the order of the Treasurer of the United States

THOS. D. FISTER,
Acting Supervising Architect.

Oct 23, 1888.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C. until 2 o'clock P. M., on the 24th day of November, 1888 for the labor and materials required in the erection and completion of the Ornamental Tiling for walls, wainscotting in the court rooms frescoing of walls, ceilings etc., of the U. S. Court-house, Postoffice etc., at PEORIA, ILL., in accordance with specification and drawings, copies of which may be obtained at this office or the Office of the Superintendent.

Each bid must be accompanied by a certified check for $500.

November 2, 1888.

WILL. A FREEFT
Supervising Architect

CHAS. SHELDON.
JOHN A. SHELDON.

SHELDON & SONS,

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EXCELSIOR IRON WORKS CO.,

Founders and Machinists,

—Manufacturers of—

Steam Engines, Derrick Irons, Stone Hoisters
Stone Gangs, and
GENERAL QUARRY SUPPLIES.

Cleveland, O.

Champion Quarries!

J. A. GREEN, Proprietor,

Our Stone can be quarried at any season of the year. Frost or heat does not affect it It grows harder and better the longer it is exposed to the atmosphere.

GOOD LIME, CEMENT, ETC., ALWAYS ON HAND. Write for Prices.

STONE CITY, IOWA.

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R. A. HALL,

MANUFACTURER OF

TRIMMED AND SAWED-EDGE **ROOFING SLATE.**

Hearths, Tile Bordering, Etc.

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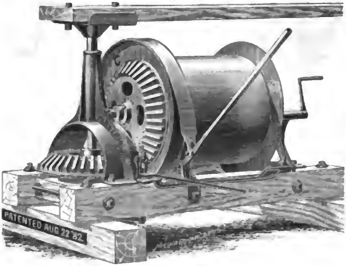
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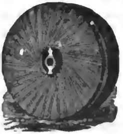

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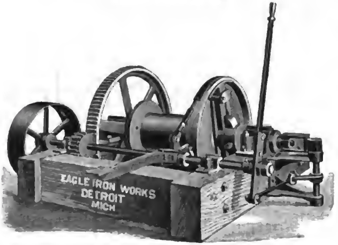

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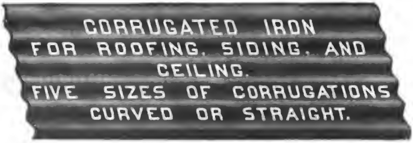

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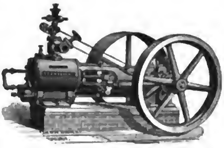

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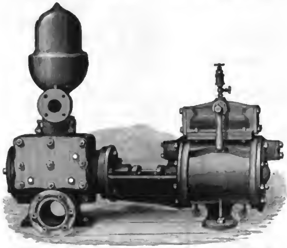

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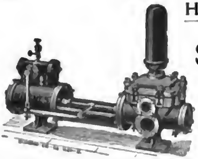

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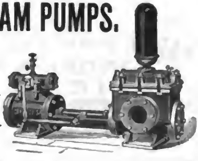

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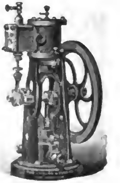

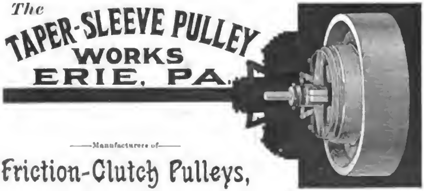

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STONE

VOL. I. INDIANAPOLIS, IND., DECEMBER, 1888. NO. VIII.

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

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Readers of "STONE" who desire to purchase machinery, or wish information concerning any class of machinery, not advertised in our pages, are invited to send particulars, and we will put them in the way of satisfying their wants without charge for the service.

ORGANIZATION is the watchword among marble and granite dealers! Stone proclaims it, and backs it up with convincing argument. Organize!

MARBLE dealers, and workers in stone and marble, are full of snap if you start them going. Let a number set example by sending us their ideas for publication. Shake up the drybones in the trade!

BEWARE of the chap who slashes prices. This is as pertinent in journalism as it is in the marble and granite trades. Taboo the fellow who does it. A fair price for a good article! Anything else is unjust, unbusinesslike!

A PROMINENT geologist, and a man of national reputation for the great work he has performed in the advancement of geological science, sent in his subscription for a half dozen copies of Stone to go to friends, remarking that, "The articles from Profs. Johnson and Baker in your October issue, are alone worth more to me than the sum I send you."

A NEW journal called *The Monumental News* is soon to issue from Chicago. We shall welcome it if it is deserving, but there seems to be some mystery about it. Its projectors do not make themselves known, and its place of business is "Postoffice Box No.—." This excites suspicion. The prospectus doesn't promise much that cannot be met quite easily, and we do not see why they should not come out squarely and let the trade know what it can reasonably depend on. We give them the "pointer" that the marble and granite dealers of this country have had sufficient experience with ragged journals, conducted as adjuncts to a tombstone brokerage business. Stone has comforted them with the example of what journalism can do when freely directed in the interests of such an intelligent and progressive constituency as is found among the marble and granite producers, dealers and workers of this country. Any other journal seeking support from them must keep alongside of Stone, and we promise to make it trot lively to do it. If *The Monumental News* shall prove to be worthy in these respects, we shall cordially welcome it as a valued assistant in the good work we have undertaken.

ONE of the most interesting speculative scientific works which has come before the public for several years is Ignatius Donnely's "Ragnarok." In it he puts forth the theory, in a very plausible way, that the drift which covers a large part of the earth's surface is due, not to any action upon the earth itself, but to the collision in remote ages with a comet which deposited clay, gravel and the other material of which the drift is composed. While the book does not present any conclusive reasoning the ideas presented are attractive and his objections to current opinions with reference to the drifts are, to say the least, calculated to disturb one's belief in them. Some of his descriptions are fine and worthy of reading from a purely literary standpoint. His description of the way in which a comet is formed is of value from the clearness with which it presents the nebular hypothesis and the manner in which it shows why one body became a planet like our earth and another a comet. We remember no more vivid description of the method in which all our planetary system is supposed to have been formed.

STONE is greatly pleased over the action of the new association of marble and granite dealers of Nebraska in cordially indorsing it as a creditable journal of the trade. We shall try and prove worthy the good opinion of our friends. It goes to prove that earnest effort, fair dealing, and honorable purpose is appreciated. Stone has been the subject of more flattering recognition during its short career than usually falls to the lot of new enterprises in journalism, and it greatly encourages the publishers to renewed efforts to place it where it properly belongs—in the lead of class journals. We have not heretofore made editorial mention of this matter, but now take occasion to thank our good friends of the National, the New England, the Ohio and the Nebraska Associations for the confidence they have voted us.

[Written for Stone.]

ON THE SELECTION OF BUILDING STONE.

GEORGE P. MERRILL, CURATOR IN THE NATIONAL MUSEUM AT WASHINGTON.

THERE are many more factors which determine the value of a stone for purposes of construction, than are usually taken into consideration. The climate of the region in which a building is to be erected with especial reference to the annual rainfall and the extreme variations of heat and cold; the location with reference to large cities and manufacturing establishments, and even the directions of the prevailing winds and storms should all be considered as well as the physical qualities of the stone itself.

Although these are problems which should receive most careful attention from the architect and builder, in reality, and with shame be it said, they receive scarcely a thought, the items of present cost and perhaps color being alone considered. All kinds and all qualities of stone are brought fresh from the quarries and hurried into buildings with no further tests of their qualifications than possibly that of pressure, a test which in itself alone is almost worthless, since there is at present scarcely a stone in the market that will not bear all the pressure liable to be required of it, while there are quantities which within a limit of even ten years will so discolor, disintegrate or scale as to be worse than worthless. Nor is the selection of proper stone for any specific purpose an easy matter. However strong the stone may be there is always the question of its weathering properties that cannot be readily answered.

The external aspect of the stone will give no clew to it, nor can all the tests we yet know determine to a certainty in the laboratory just how a given rock will withstand the tests of absorption of our variable climate, and the gases of our cities.

The cities of northern Europe are full of failures in the stones of important structures. The most costly building erected in modern times, perhaps the most costly edifice reared since the great pyramid, the parliament house in London, was built of a stone taken on the recommendation of a committee representing the best scientific and technical skill of Great Britain. The stone selected was submitted to various tests, but the corroding influence of a London atmosphere was overlooked. The great structure was built, and now it seems questionable whether it can be made to endure as long as a timber building would stand, so great is the effect of the gases of the atmosphere upon the rock.

Our Northern and Eastern states with an annual precipitation of some thirty-nine to forty inches and a variation of temperature amounting in some cases to not less than 120° are necessarily more trying than those where the precipitation is much less or the temperature more uniform. There is many a porus sandstone or limestone which could endure an exposure of hundreds of years without injury in a climate like that of Florida or New Mexico, but which would probably be found in a sad state of disintegration at the end of a single season in some more northern state. We are accustomed to hear a great deal regarding the wisdom of the ancients, and especially the Egyptians as shown in the selection of enduring material for their obelisks and monuments, a wisdom or prudence which modern builders "admire more than they imitate," and we are referred to the still legible inscriptions and sharp sculptures on the surfaces of these obelisks even after thousands of years' exposure, as proof of this marvelous forethought on the part of a semi barbarous people.

It must be borne in mind, however, that nature herself had vastly more to do in this matter than Egyptian foresight and it is more than probable that at that time materials were selected with as little regard for their lasting qualities as they are to-day. The Egyptian granite, so durable under Egyptian skies, is no better than those in common use in this country, as the transported obelisks in London and New York only too well attest. It is a matter of climate more than material, and this fact should never be lost sight of for a moment.

The precaution which should be observed in selecting a stone for building purposes may here be briefly alluded to. In those regions where glacial action once prevailed and where the mass of rotten rock that had accumulated through long geologic ages has been entirely removed, if the surface of the rocks as displayed in the quarry or natural outcrop presents a fresh and undecomposed appearance, this may be construed as a strong argument in its favor, though it cannot in all cases be accepted as conclusive. A purely calcareous rock may weather rapidly and yet leave no debris, since its constituents are readily soluble and may all be carried away by running water leaving no trace of the havoc going steadily on. Impure limestones and all siliceous rocks, however, leave a pile of debris as a mark of their decay. But in regions south of the glacial limit the rock is still covered by the decomposed mass and hence no clue can thus be obtained. In such cases one can only have recourse to structures that have already been erected from the stone in question and there observe its weathering qualities, or if these are lacking, observe the stone in those parts of the quarry that have not recently been worked. In opening a new quarry blocks should always be tested by allowing them to lie and season for a year at least before using. At the end of this time the presence of any readily oxidizable mineral will have made its presence known and the amount of induration or disintegration, as the case may be, will furnish a slight clue regarding its future behavior. Indeed this seasoning of stone prior to its introduction into a building should always be insisted upon. A good building stone, whatever its kind, should possess a moderately fine and even texture with the grains well compacted, should give out a clear ringing sound when struck with a hammer,[*] and show always a clean fresh fracture. It should also be capable of absorbing only a proportionally small amount of water.

The porosity of any stone is usually characteristically shown by its manner of drying after a rain; some will dry quickly, while others which have absorbed a larger quantity of water will remain moist a long time. In the case of a sandstone it may be said that the grains of which it is composed should be so closely compacted that the proportion of cementing matter is comparatively small. Of all cementing materials the argillaceous and calcareous are the least durable and the purely siliceous the most so, the ferruginous cements standing intermediate in the series. Indeed a purely siliceous sandstone the grains of which are cemented closely by a siliceous cement may be classed as one of the most durable stones, although unfortunately on account of their hardness and poor colors, such can be utilized only at a considerable expense and not always with good effect.

Prof. Geikie writing on this subject mentions an instance in which a fine siliceous sandstone erected as a tombstone in Greyfriars churchyard (Edinburgh) about 1646, and afterward defaced by order of the government in 1862 still showed the chisel marks upon its polished surface after a lapse of over 200 years.

In this connection the following table upon the "life" of various kinds of building stone in New York city is of interest. By the term *life* being signified the number of years that the stones have been found to last without discoloration or disintegration to the extent of necessitating repairs:

---

[*] In a report of some experiments on the transverse strength and elasticity of building stone, Mr. T. H. Johnson states "the resonance of each piece tested was proportional to the modulus of elasticity as found by the test." Rep. State Geologist of Indiana 1881, Page 38

	Life in years.
Coarse brown sandstone	5-15.
Laminated fine sandstone	20-50.
Compact fine sandstone	100-200.
Bluestone (Sandstone.)	Untried, probably centuries.
Nova Scotia Sandstone	Untried, perhaps 50-200.
Ohio Sandstone. (Best siliceous varieties.)	perhaps from 1 to many centuries.
Limestone, coarse fossilliferous	20-40.
Limestone, fine Oolitic (French.)	30-40.
Marble, Dolomite (coarse.)	40.
Marble, Dolomite (fine.)	60-80.
Marble fine	50-200.
Granite	75-200.
Gneiss	50 years to many centuries.

The fact that certain quarries have furnished good material in the past is no guarantee of the future output of the entire quarry. This is especially true regarding rocks of sedimentary origin as the sand and limestone, different beds of which will often vary widely in color, texture, composition and durability though lying closely adjacent. The writer has seen tombstones made from the Connecticut brownstone which though they had been exposed upwards of two-hundred years were still firm and intact with the inscriptions perfectly legible. But on the other hand the house fronts of New York City furnish innumerable illustrations of disintegration of stone from these same quarries, after an exposure not exceeding twenty years; the whole difference in durability being in this case due to the varying character, at different depths, of the material binding together the grains of sand of which the stone is made up.

In many of the quarries of calcareous rocks in Ohio, Iowa and neighboring states the product is found to vary in different depths all the way from a pure limestone through magnesian limestone to dolomite. The cause of this remarkable variation is little understood and cannot here be touched upon, but the fact that such occurs is of importance, since in many and perhaps the majority of cases an equal variation exists in point of durability. By English as well as many other authorities a dolomite is considered, other things being equal, more durable than a limestone, and beyond all doubt this is the case in localities where the atmosphere is at all acidic since dolomite is but little effected by these agencies. Aside from this it would seem yet to be proven that, in the United States, a pure limestone was less durable than one that contained the necessary magnesia to constitute a true dolomite. Indeed Prof. Hall considers the magnesian limestones as a whole more friable, more porus and less firm (and consequently less durable) than the pure limestone. Stones which are mixtures of limestone and dolomite are liable to unequal weathering, the limestone crystals becoming eaten out by the acid gases of the atmosphere while the dolomite particles are left to project and give a rough and lustreless surface. Coarsely fossiliferous stones are usually to be avoided for exposed work as they weather unevenly owing to the unequal hardness of the fossils and the matrix in which they are imbedded. Thus the coarse gray Niagara limestone from Lockport, New York, used in the construction of the Lenox Library building in New York city, began to show signs of decay even before the structure was completed. It should be remarked however that this extreme rate was due in part to the fact that the stone was laid on edge and not on its natural bed. The limestone of which was constructed the capitol building at Nashville, Tennessee, has proved so inferior owing to the weathering out of the numerous fossil *orthocera* it contained that the quarries have been discontinued for this cause alone.

Veined stones are also subject to unequal weathering when exposed. This being due to the unequal hardness of the vein matter and that of the mass of the rock. This is true of all stones but is especially noticeable in the so-called verdantique marbles where the white veins of calcite lose their polish and crumble away more rapidly than the serpentine which composes the bulk of the rock. Good examples of this are to be seen in the bases of two statues in front of the City Hall in Boston.

Stones which like many marbles contain seams of mica, talc or other minerals are objectionable for similar reasons. Thus the marble column supporting the statue of Lincoln in front of the City Hall at New York, though having been erected but some 20 years is to day cracked throughout its entire length owing to the opening of one of these seams of talc. It may be stated further that in the majority of marbles and such other stone as are used chiefly for decorative works, those variously colored lines, and veins, or other structural features which give the stone its chief beauty, are in reality flaws and lines of weakness. There is many a beautiful imported marble which when sawn into a thin slab will scarcely bear its own weight, but must be backed by cheaper and stronger material. I may say here that the essential qualities of a marble aside from color, which may vary almost indefinitely, are that it shall possess a texture sufficiently compact and hard to take a smooth surface and acquire a high polish. The chief defect in almost all American marbles, and one that does not as yet seem to be fully realized, is that they are too coarsely crystalline. This not only renders the production of a perfect surface difficult but the cleavage facets frequently reflect the light from below the surface in such a way as to destroy its uniformity. However good the color may be a stone of this nature must always rank lower than one that is so fine-grained and compact as to appear non-crystalline or amorphous. It is this fact and this alone that renders the American marbles now in use inferior to such as are imported from Belgium, the French Pyrenees, Italy or Northern Africa. Those who are seeking new sources of marbles will do well to bear this in mind.

OPENING A QUARRY.

While there is considerable difficulty in judging as to the outcome of a new quarry, there can be no doubt but modern investigations and methods have had a great deal to do with making the risk slight. The primary suggestion as to the value of a quarry; or as to the possibility of the general use of the stone is usually brought about by its local use as a building material. People point to gravestones, bridge foundations, posts under houses, and many other local uses of the material to subsantiate its material value. There is in this state unworked, except in a small way, a most excellent bed of fine sandstone. Its texture is delicate, its color rich. It has been in use in bridge foundations and gravestones for over thirty years. Science has done a great deal during recent years to make investments more certain. Their value is proved by the demonstration of time. Rocks which have stood the test of years indicate the physical condition necessary. Science has determined these. It applies the formula developed by time to the recent discoveries.

A flag-stone sidewalk is now being laid in front of a private residence in New York City, each stone of which measurers 20x 15 feet and 1 foot thick. Their cost when laid, will be $1,000 a piece.

The retail marble dealer who becomes a subscriber to STONE makes his largest commission.

ROCK HISTORY—III.

During the earlier part of the world's history the climate and air were very different from what they are at present. The air was very dense and heavy, being filled with gases of which carbonic acid gas was probably the most prominent. These gases were in the air at the time of the cooling of the earth from a liquid state, and were absorbed and made a part of the material of the earth at various times until finally the air became what is now known. These gases served a two-fold part in the economy of nature. As said they were used in the formation of parts of the earth's material. This is shown more prominently during the coal measures than elsewhere, when large quantities of carbonic acid gas was absorbed by the abundant vegetation and laid away in our coal in the form of carbon. Another purpose which these heavy gases served was to keep the earth warm. This use is very clearly explained by LeConte. He shows that there are two kinds of heat, light-heat and dark-heat. There are substances which are transparent to light but are opaque to heat. But if the heat be accompanied by bright light it seems to be forced or carried through by the light. Such heat is light heat. Glass will freely admit light but will not permit the passage of heat through it, unless accompanied by light. Sunlight will carry into a greenhouse the heat of the sun, but when this heat is once there it becomes dark heat, the glass retains it, and it cannot pass out.

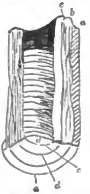
Our atmosphere is another transmitter of this class. The heat from the sun passes through it with the light but when it has heated the earth it is transformed into dark heat and imprisoned here by the atmosphere. This has long been known; but Prof. Tyndall has proved by experiment that when the atmosphere is charged with carbonic acid gas, it retains the sun heat in a much greater degree. The gas acts as a double blanket to keep the earth warm. Thus it is readily seen that during the early history of the earth when there were large quantities of gas the earth was much warmer than at present. Another reason for the climate being warmer than now, is to be found in the fact that there was a much smaller proportion of land and much more water than at present. And again, the mountains had not then been formed at that time, and the climate was practically the same in all parts of the earth. We find evidences of tropical vegetation as far north as geological research has gone. It is not improbable that the inclination of the earth's axis was different at that time from now, and that a change in the inclination caused much of the difference in temperature between the poles and the equator. But from whatever cause it may have come there has without doubt been an immense change in the temperature of the earth. The average temperature is not only lower, but there has been a change from a tropical air over the entire earth to our frozen poles and tropical equator.

Fern Leaf.

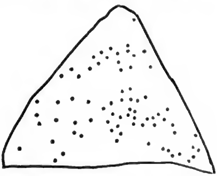
Cordaites.

The Devonian age was followed by what is known as the carboniferous. It was in this period that nine tenths of all the coal of the world was formed. The depth of the carboniferous formations has been found to be in Nova Scotia over 14,000 feet, in South Wales 14,000 feet, and in Pennsylvania 9,000 feet. This formation is made up first of what is known as the sub-carboniferous period, which is a deposit of limestone, containing marine fossils. This sub-carboniferous rock underlies and surrounds as an outcrop the basis of coal in both America and Europe, above the coal measures proper is what is known as the permian rock which is not particularly interesting excepting as showing a period of transition. These rocks are mentioned to account for the depth of what is known as the carboniferous system when so small a part of it is coal-bearing. The coal measures only are of particular interest and it is to these that we will confine our attention.

That coal is the result of the transformation of abundant and luxurious vegetation is unquestioned. We find coal which has the structure of wood plainly discernible; we see the trunks of trees standing erect in the coal fields, we find leaves and pieces of plants preserved entire in the coal and from these and other evidences it is beyond doubt that coal was made from trees and other vegetation. That the vegetation was luxuriant beyond anything now known is proved by the size of the plants preserved. We find ferns such as are growing now which reached the size of trees, and other vegetation shows undoubted evidence of having reached a size now unknown. All of this was the result of the heat and state of the atmosphere during the carboniferous period. There was undoubtedly abundant moisture accompanying the high temperature. It is during the carboniferous period that we find the first evidence of a decided advance in land vegetation. Previous to this time the number of species had been small and they seemed to play no very important part in the economy of nature. But during the carboniferous period there was an immense advance. The number of species increased so that out of from 2,500 to 3,000 known fossil species of plants 700, or about one-fourth, are from the coal measures. This is the first



Trunk of Conifer, a tree of carboniferous period; a—bark; b—wood; c—medullary sheath; d—pith.


Plan of Fossil Forest shown by present remain.

diversified and highly organized flora known. It was made up principally of orders not now existing. Of those now known the palms and ferns were the most abundantly represented.

While there is no question that our coal was formed from vegetable decay there has been and is now much discussion as to the method of coal formation. The explanation here given is perhaps the most generally accepted. Coal must have been formed in the presence of abundant moisture. The decay of wood which occurs in dry air results in a falling to pieces, in the formation of a wood dust. The decay must have occurred in the presence of water in much the same manner as peat is formed at the present day. In other words coal was formed from the presence of immense peat bogs. Imagine at the mouth and along the low banks of a river on a clay soil which retains the moisture, a heavy growth of carboniferous vegetation. The air is warm, moist and heavy, the leaves through untold years fall on the damp ground, the pieces of branches and twigs fall among the leaves, to be kept moist and decay where they fell. The deposit of parts of trees and leaves grows, probably with a rapidity hard to conceive in present conditions until it is many feet thick. Then this deposit was covered with a thick layer of sand and left to itself. The further process necessary to the formation of coal is purely chemical. The different elements react on each other. Some of the carbon unites with oxygen forming carbonic acid gas, and some of the hydrogen unites with some of the oxygen forming water, etc. The process is too long and involved to admit of explanation here. As shown above, there would always be clay soil underlaying a coal seam in order that the water might be retained on the surface and produce a luxuriant vegetation. Such is the case, under every coal seam is found a layer or deposit of clay, while over it is always found a deposit of sand. Sand is always deposited under water. From some unknown reason the peat bogs were lowered in elevation so that the sea covered them and sand was deposited. Then in time came an elevation of the surface and a new vegetation grew to form another peat bog upon which in turn was deposited a layer of sand. In the coal fields are often found strata of sandstone, limestone, fire-clay, iron and coal, one above the other and the whole series is repeated many times. All of this must have taken ages, but in the geological history of our earth time has been no consideration.

The illustrations given are self-explanatory. The fern leaf looks as though it might have been taken from a forest of the present time. The cordaites is given that there may be some idea of the unfamiliar vegetation of coal measures.

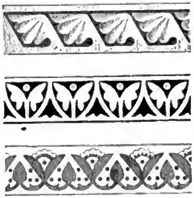
Correspond with us. Quiz us with questions. Perplex us with problems. Let us know what you are doing. We can be a helpmeet to you.

The real estate of the late Dorset Marble Company, at East Dorset, Vt., including over 200 acres of land, quarries and mills has been bought by the Vermont Marble Company and Gilson & Woodfin, of Rutland, so we are informed. Besides this the sale includes the Sherman quarry and what is called the Manhattan property at West Rutland, which is a quarry and a mill, with twelve gangs of saws, also a mill at Hydeville and a lot of marble which was owned by Sherman & Gleason when the Producers' Marble Company's pool was dissolved, and the hoisting power and derricks, which are valued at $2,500.

A company of Fort Collins, Col., men have decided to go into the marble quarrying and lime-burning industry. They have leased the Sam Barnes marble beds in the Buckhorn, eighteen miles southwest of Fort Collins, and will commence operations immediately.

BORDERS.

THIS is a continuation of the series of borders which we have been publishing for some time. Little need be said about them, excepting to ask that they be used. One who knows, once said that a thing is not nice because it is artistic, but that it is artistic because it is nice. This is contrary to the opinion of a great many ignorant people; there are those who ape the artistic, and who pretend to like things because they think they are artistic. This comes from foolish men, and many women and children. This craze for the artistic, while it is very annoying, really does great good. The insincere people drop out, others are educated, and on the whole there is constant advance. Designs like the ones that we here give may be worked onto a plane surface where a border is thought to be neccessary, and at least will not injure the appearance of the surface where the labor is bestowed. In truth, the very large proportion of this kind of work that is done by the stonecutters of the country is ugly.



SANDSTONE DEFINED.

If your piece of sandstone is well chosen for you, you will be able to write down the following characters:

1. The stone is made up of small grains.
2. The grains are all more or less rounded or worn.
3. By scraping the surface of the stone, these rounded grains can be separated from the stone, and when they lie in this loose state, they are seen to be mere grains of sand.
4, More careful examination of the stone shows that the grains tend to lie in lines, and that these line run in a general way parallel with each other.
5. The grains differ from each other in size and in the material of which they are made. Most of them consist of a very hard, white or colorless substance like grass, some are perhaps small spangles of a material which glistens like silver, others are softer and of various colors. They lie touching each other in some sandstone, in others they are separated by a hard kind of cement, which binds them all into a solid stone. It is this cement which usually colors the sandstone, since it is often red or yellow, and sometimes green, brown, purple, and even black.

Summing up these characters in a short definition, you might describe your sandstone as a stone composed of worn, rounded grains of various other itones arranged in layers.—*Manufacturer and Builder.*

"Mistah Fayley, I guess de baby's swallowed some rat pizen, an' ma t'ought maybe you'd know wot was good fur it."

"W'y, chile, yo' gib it an anecdote right away!"

A company at Warren, N. H., is manufacturing crushed stone by steam machinery which they ship to Montreal for street and sidewalk use.

THE METHODS OF THE PHYSICAL TESTS.

A detail of methods of physical tests, as given by Prof. Dodge, is as follows:

Determination of specific gravity. This was executed by the usual method for solid bodies, with the use of an analytical balance. The specimens were nearly of the same size and approximately cubical, having been split out by hammer and chisel. They measured from an inch to an inch and a half on a side, and weighed on an average about 50 grammes. They were in an air-dried state, having been allowed to lie on a table in a warm and dry room for several weeks before their specific gravity was determined. They were then severally weighed. They were then immersed in water and allowed to remain about twenty-four hours, when all evolution of air bubbles had ceased. They were then weighed in water, suspended by a thread. The weight in air was divided by the loss of weight in water, and the result was taken as the specific gravity.

Determination of the absorption of moisture from a damp atmosphere. The samples of stone were placed in the cells of a hot-water bath for several days, to expel their hygroscopic moisture. They were then allowed to cool in desiccators, over sulphuric acid, and were weighed. They were then placed upon a set of glass shelves standing in a pan of water, and a tight cylinder was inserted over the shelves, the mouth of the cylinder being sealed by the water, after the manner of a gas holder. The apparatus remained thus in a room whose temperature was pretty uniform, from 60° to 70° Fahrenheit, for seven weeks, the water being replenished from time to time, so as to maintain a constant closure of the cylinder. Then the stones were removed to bell-jars in which they were supported over water, and thus taken to the balance and weighed. The stones submitted to this test were somewhat larger than the pieces used for making the determination of specific gravity. They had an average weight of about 70 grammes. They were roughly shaped. The minimum absorption of moisture .03 per cent. of the weight of the stone, is so small in amount as to be practically nothing. The maximum, 3.94 per cent. of the weight of the stone, seems quite considerable. It seems probable that, in the atmosphere saturated with moisture in which they were kept for seven weeks, some of the stones absorbed all the moisture they were capable of taking up, while others by a longer exposure to the same conditions would have shown still higher figures.

Determination of the absorption of water by soaking. A third set of stones with an average weight of about 70 grammes, approximately rectangular and measuring from an inch to an inch and a half on a side, were dried in the hot-water bath to expel moisture. They were then cooled in the desiccator and weighed. They were then placed in a large porcelain dish of water and allowed to soak for four days. They were then severally taken from the water, and after the water had been removed from their surface by pressing bibulous paper upon them, they were weighed as expeditiously as possible to avoid loss by drying. The increase of weight is expressed in percentage figures. The increase of weight thus shown, especially by several sandstones, is in some cases very considerable. In other cases the absorption of water by soaking is scarcely greater than the absorption from a damp atmosphere after the lapse of some weeks.

Determination of the action of carbonic acid. A set of pieces, similar in size and shape to those used in the previous determination, were dried for six days at 212° Fahrenheit, then weighed. They were then suspended by strings in a glass vessel of water, not in contact with one another, and a stream of carbonic acid gas was run through the water for several hours at short intervals, so as to maintain the water pretty well saturated. The gas was washed before entering the vessel containing the stones. The water was changed every few days by use of a siphon. The action was continued for six weeks. The stones were then soaked in pure water, wiped, dried at 212° F. for six days and weighed. The loss of weight is given in percentage figures. Two glass vessels were used in the experiment. The limestone pieces were placed in one, the sandstone and granite in the other. The two were treated as nearly alike as possible. The stones suffered scarcely any *visible* change. But the water in the vessel holding the limestones became highly impregnated with carbonate of lime; that in the other much less so.

Determination of the action of strong acid fumes. Another set ot pieces of stone, similar in size and shape to the preceding, were dried for six days at 212° F., then weighed. They were then placed in an apparatus similar to that used for determining the absorption of moisture, constructed of glass and porcelain, the porcelain pan containing strong muriatic acid, and a bottle containing nitric acid being placed within the apparatus, as also a bottle containing muriatic acid and black oxide of magnanese, for the purpose of evolving chlorine. In this apparatus, exposed to the strong fumes, the stones remained during seven weeks. They were then removed and placed in water to soak, this water being repeatedly changed. When free from acid they were dried for six days as at first, then weighed. The loss of weight is given in percentage figures.

The design of this test was to determine the disintegrating and staining effects produced by oxydizing agents, representing the action of the atmosphere intensified in degree and concentrated in respect to time.

Determination of the effect of frost. In this determination the pieces which had been used to test the absorption of water by soaking, whose weight dry had been previously learned, were placed in a shallow iron pan, nearly covered with water, and exposed outside the building in a sheltered place to freezing and thawing from February 4th to April 1st, eight weeks. To thaw, they were occasionally brought into a warm room for a few hours. During the time stated very little intense cold was experienced, but the water in the pan was in a frozen state nearly all the time. After this exposure, the pieces were carefully examined, then dried for six days as usual and weighed. The figures show the *loss of weight* caused by slight crumbling of the edges, etc., by the action of frost.

Determination of the effect of heat. For this determination a muffle furnace was made use of. The temperature of the muffle was raised to a red heat; then the samples of stone, one after another, were exposed to the heat of the muffle, being at first placed near the open mouth of the muffle, then gradually moved inward until they came into the hottest part and were heated to redness. Observations were made of the effect of the heating. They were lifted out with tongs once or twice and closely inspected. After the heating test in the muffle, the pieces were severally removed from the muffle and while still very hot, but at a temperature below redness, they were immersed in a tank of water for a few minutes. The action of the water, in crumbling or cracking the heated stones was observed and noted. The pieces used were in size rather larger than those used in previous tests, being from one and a half to two inches on a side for the most part. They had been well air-dried at the time this test was made with them. In these observations, as in those of the preceding tests not depending on the balance, correctness depends much, of course, on the judgment of the operator.

MONUMENTAL DESIGN.

THE following is from an essay on the Washington Monument, by Henry Van Brunt, architect. It was prepared several years ago for the *American Art Review*:

"The quality of simplicity and plainness is not undervalued as an element of grandeur in monumental composition of this sort. Repose and size are essential to such an expression. But if a mountain cliff, or even a work of engineering, is sublime because of its vast unoccupied spaces, a monument which is expressly devised to convey such a sentiment as this must be something better than a colossal cairn or a mighty chimney. Its composition should betray a certain amount of human thought and intention. Its proportion should be so delicately adjusted as to give to it an expression of unity wholeness, to which nothing can be added, from which nothing can be subtracted, without detriment to its essential quality. Its sentiment of repose must be obtained from completeness, from its evident reserve of power, and from the contrast between its great spaces of stillness and its occasional spaces of careful detail adjusted to the scale of a man, so as to force upon the spectator a true idea of its size. Its great areas of rest must have a *raison d'etre*; they should not exist merely for their own sake; mere courses of masonry, however multiplied, do not constitute a work of art; they must have an especial object to fulfill which is not merely prosaic. The lofty pilasters of the tower of St. Mark would be meaningless and absurd, if they did not support the delicate order of the belfry. The great wall veils of the Romanesque churches would be expressionless and without true majesty if they were not bounded by battlements and buttresses, crowned by arcades and machicolations, and broken, however rarely, by windows and doorways decorated with the most exquisite sculpture and the most graceful tracery. Nay, even the triumphal arches of Rome, if they did not bear aloft mighty inscriptions, would lose half of their significance as monuments.

"Therefore a bare unfigured tapering shaft of masonry, magnifying the Egyptian monolith, but drawn out far beyond the proportions fixed in the prototype and set upon a level platform, which furnishes the principal novelty of composition in the modified design now apparently actually in process of erection, though brutally, from its mere size, it must force itself upon the attention of the beholder, and awaken a certain sense of amazement, is not capable of suggesting any emotion such as should be conveyed by a monument erected to express a national sentiment. We can conceive that as a permanent landmark erected to fix a definite point of territory, like a term, or perhaps to mark the starting point of an initial base-line in some great geographic survey, as a mathematical point, it might have a certain fitness, as it is tall, durable and singular. But if it is intended for any higher service,—to emphasize a point in the history of a nation, or to symbolize the character and service of its greatest citizen—it is dumb. Imagination is starved, and memory sleeps in its presence. It can hardly be too earnestly insisted that such higher service demands a work of art, and that mere hugeness and smoothness do not meet the conditions; therefore, even if carried to the height of a thousand feet, a mere shaft is no more than an expression of geometry, grossly inadequate to an occasion so great, and unworthy of a nation so liberal, prosperous and enlightened.

"The monument on Bunker Hill is of the same kind. It has but one merit,—it speaks from afar, and stands like a mighty beacon. But until the story which it is intended to commemorate has been told by bas-reliefs or historical inscriptions, engraved upon its now vacant and expressionless sides; until it bears the names of the patriots who served or fell upon that pathetic field, set forth with letters which cannot perish, the stranger can only wonder, as he approaches it, why so vast a pile makes no sign and utters no oracle."

THE CEMETERIES AT CONSTANTINOPLE.

At Constantinople the big Mussulman cemeteries are sights that every visitor goes to see. From the comprehensive outlook of the Saraka or Galata Tower, a panoramic view of the city embraces forests of dark cypress here and there. The black masses of woodland stretch along the Golden Horn, and encompass the city on every hand. They are the famous cypress graveyards of the Ottoman capital, and well worth visiting, as nothing like them is to be seen elsewhere. These cemeteries may best be described as dense forests of cypress trees and tombstones—tangled masses of graves and trees. The cypresses have grown to enormous proportions, and the dense, dark foliage forms a ceiling through which the sunshine penetrates only in streaks. The cathedral isles of the trunks, and the tablets of the dead, are bathed in twilight all day; on moonlight nights the dark cypress cemeteries are weird pictures, indeed. The Constantinople headstone is a rude representation of the human form, with a fez or turban chiseled on the top, so that on these moonlight nights they may well be taken for crowds of ghosts. In these Constantinople cemeteries too, one may read a rare essay on natural economics. Whence comes the remarkable vigor and thrifty appearance of those thousands and hundreds of thousands of huge cypresses? The other hills and vacant areas around about them are barren, and trees planted thereon and left to take care of themselves would hardly survive. Whence, then, come the giant growth and the dark, almost black, glossy foliage of the cemetery forests? The Turkish custom of crowning their gravestones with a representation of the head-dress worn by the departed during life, furnishes a ready index to the age of the grave, apart from the epitaph. Side by side one sees in the Constantinople cemeteries the huge turban of the time of Mahmud II., and the modern fez, the former still a mass of gilt, the later painted red. But the most impressive feature of the cypress cemeteries, and that which appeals particularly to the imagination of the Western visitor, is the way the headstones are crowded together. In spots they are literally placed as thick as they can stand, a mass of upright slabs through which one could hardly force a path. In other places they are toppled over, and lie like fallen sticks of timber one over another. The dead of different periods must have been buried one on top of another, and new bodies wedged in wherever enough soil was found to cover them up. Well might the proud old cypresses lift their glossy heads skyward and increase their swelling girth.—*Thomas Stevens, in New York Evening Post.*

Any quarryman, stone, granite, or marble dealer or worker who subscribes for STONE for 1889 we guarantee will get tenfold value, or the subscription price will be refunded.

NATURAL GAS.

The natural gas of Indiana and regions contiguous to it comes from a formation of the earth which is much earlier than that which contains gas in the Pennsylvania fields. The gas of Indiana comes from or beneath the Trenton rock, which is one of the strata of the lower silurian. The gas of Pennsylvania is from the carboniferous period.

Workmen in the stone quarry of the Nevada State Prison, a Carson, recently uncovered a stone on which were the impressions of immense feet, resembling a man's in shape, some of them measuring 15x5 inches.

CEMENT TESTS.

The weight of Portland cement varies from 70 to 92 pounds per cubic foot for brands of equally good quality. Since we buy by weight it is immaterial what size the manufacturer must give to a barrel in order to bring it to the standard gross weight of 200 pounds, but each factory should be held to uniform weight of its output, the extreme difference not to exceed 2 per cent loss by leakage.

Finest grinding of the whole mass coming from the kiln, and not merely fine sifting with a large percentage of granular residues on the sieve, is very important. All the granular residues, even on the finest silk sieves, have, practically, no setting power, and act little better than good sand.

They represent the well burned clinker which did not yield to the action of the millstones as readily as the softer pieces. Finely ground cements have largely increased values for mixtures with sand. The new German regulations allow a residue of ten per cent on a sieve of 13,000 meshes per square inch.

Cements which set in less than half an hour are called quick setting, and those which do not set before two hours, slow setting. These distinct provisions prevent misunderstandings as to what is meant by a slow-setting cement.

Excepting special cases, slow-setting cements, as most trustworthy and best suited, must be specified for all works in architecture. According to the eminent American, Gilmore, needle test, cement begins to set when it bears a wire of $1\frac{1}{12}$ inch in diameter loaded with $\frac{1}{4}$ pounds, and has set when it bears a needle with a flat end, of $\frac{1}{24}$ inch diameter, loaded with 1 pound, without making any impression on a flat cake of cement. Whether the volume of the cement has altered during or after setting is ascertained by immersing in water a thin cake spread upon a glass plate.

Signs of crumbling or cracking at the edges indicate expansion. Fissures in the center of the cake arise generally from premature exposure to drafts or sun heat, which causes shrinkage.

The cementing power of Portland cement shall be ascertained by a mixture of sand and cement, as used in actual work, since reasoning from tests on the comparative value of different cement for mortar is unavailable. A most interesting instance is presented by tests made by the Association of Civil Engineers, of Bonn, Prussia.

Pure cement gave, after 28 days, 426 pounds, and after 6 years 556 pounds, tensile strength. One volume of same cement, mixed with three parts of sand, give, after 28 days, 170 pounds, and after 6 years, 720 pounds, average tensile strength 160 pounds more than the high figure for pure cement.

For all mortars, or cements, test sands of equal size, quality and condition must be used for obtaining comparative figures. This is done by washing and drying quartz sand, removing the coarsest parts by a No. 20 sieve, 400 meshes per square inch, and the finest particles by a No. 30 sieve, 900 meshes.

Tensile strength has been generally used of late years as the convenient gauge for resistance to other strains. Though these relations are not unfiorm for different cements, it should be upheld as the expression of the cohesion of the mortar. The German regulations have restored as the leading test that for compressive strength. They require slow-setting Portland cement, mixed in the proportion of one part, by weight, to three parts of regulation sand, to have a minimum tensile strength of 230 pounds, and compressive strength of 2,800 pounds per square inch, after 28 days' exposure—one day in the air and 27 days under water.

It is a grave error to require on works above the water level, a too high tensile strength, at an early day. Hydraulic quickness for exposure to the atmosphere is obtained at the expense of durability, while moderate strength and gradual increase with age are to be encouraged.

Maclay continued to test cement rejected under the seven days' test. It overtook the accepted cement after a fortnight, and after 18 months the advantage gained was kept up, 487 against 439 being the ultimate figures of strength.

The strength of the cement increases from 35 to 40 per cent in the interval between 7 and 28 days after mixing. The proportion between tensile and compressive strength, and between 7 and 28 days, having been ascertained for a brand—new cargoes received during the season—may be controlled by the tensile test, after seven days exposure for adhesive strength. There are no new data, Mr. Grant found, for a mortar of 1.2 of sand, after 26 days at 15 to 30 pounds per square inch.

The properties of Portland cement, as enlarged upon, characterizes it as an excellent building material, especially useful in hydraulic architecture and important works where heavy strains must be withstood within a few days or weeks after they have been built.

At high places where no difficulties from water are met and the load is but slowly and gradually imposed, reliable, slow-setting, natural cements are competent competitors to the Portland, since a breaking weight of 300 pounds, attained by the latter in a week, is by the better class of them approached within a year, so that a mortar mixed with them is of comparative value to Portland cement mortar, provided that equal care has been used in either case.—*Adolph Cluss, Washington, D. C.*

THE STORY OF THE ROCKS.

Geological history brings before us, says Archibald Geikie, many facts well calculated to impress our minds with the great antiquity of our planet, and with the marvelous chain of changes by which the present order of things has been brought about. We learn from it that mountains and valleys have not come suddenly into existence, such as we now see them, but have been formed gradually, by a long series of processes similar to those which are even now slowly doing the same work. We discover that every part of the land under our feet can yield up its story, if we only knew how to question it. And, strangest of all, we find that the races of plants and animals which now tenant land and sea are not the first or original races, but they were preceded by others these again by others still more remote. We see that there has been upon the earth a history of living things, as well as of dead matter. At the beginning of that wonderful history we detect traces merely of lowly forms, like the foraminifera of the Atlantic ooze. At the end we are brought face to face with man—thinking, working, restless man, battling steadily with the powers of nature, and overcoming them one by one, by learning how to obey the laws which direct them.

This is a journal for producers, workers and users of stone, marble and granite, and no one has yet had the hardihood to say it isn't a creditable one. Now is the time to subscribe.

We hear also that the bustle will have to go, but we think not, as it is a sternec nessity.

"So your name is Dorothy! Well, Miss Dorothy, do you know that you are the perfect image of your papa?"

"Oh, yes! I am often taken for my papa."

A Buffalo (N. Y.) man, who is putting up a tombstone-shop, says the first epitaph he cuts will be "To the memory of————, who died while asking what this building was to be used for."

BOOK AND PERIODICAL REVIEW.

OTTO OF THE SILVER HAND. Written and illustrated by HOWARD PYLE. With 25 full-page and many other illustrations, 1 vol., Royal 8vo, half-leather, $2.00. Charles Scribner's Sons, New York.

Like Mr. Pyle's "Merry Adventures of Robin Hood," which has had such a phenomenal popularity, his new story, "Otto of the Silver Hand," is a book far above the common run of juvenile tales. From first to last there is evidence of the painstaking zeal and ardent enthusiasm with which the artist-author has sought to bring all parts of the book, the tale itself, the illustrations, and even the handsomely-adorned cover, into harmonious relation with each other; and the result is a volume which shows Mr. Pyle at his very best, both in the spirited and absorbingly interesting narrative and in the score and more of full-page illustrations, not to mention the decorative head and tail pieces, etc., which add much to the embellishment and rich holiday appearance of the book. The scene of the tale is Mediæval Germany in the days of the robber barons, when family feuds and the general lawlessness of the time gave scope to numberless deeds of bravery and cruelty. A deep interest of a romantic and touching sort attaches to the fortunes of Otto, who is a lad of loving and tender nature, and whose adventures, among the rough chieftains with whom he is thrown, are told with vividness and uncommon spirit. Particularly interesting is the episode describing how the brave little fellow was kidnapped and how his rescue was effected by the loyalty and daring of One-eyed Hans. The picture of this chivalric and romantic period also has its distinct value, for its truthfulness to the spirit of the age is beyond question. The book, in fine, is an addition of the highest character to juvenile literature.

"STEAM BOILER CATECHISM." Robert Grimshaw, M. E. 402 pages, with index. Price $2 postpaid. The Practical Publishing Co, 21 Park Row, New York City.

This is the latest and bulkiest of the series of practical catechisms prepared by Prof. Grimshaw, and of the same order as his Steam and Pump Catechisms. It is a condensation in simplest form of practical information for the setting-up and management of all classes of steam boilers. When we consider that lack of care and ignorance is common with those who are put in charge of boiler-rooms, a book of this character should be an enforced study on every keeper.

The third volume of Alden's Manifold Cyclopedia, a marvel of condensed information covers the alphabet between the titles Artemisia and Baptisia. The embodiment of an Unabridged Dictionary of Language and a complete Cyclopedia of Universal Knowledge in one work, in large type, with thousands of illustrations, and all for a price less than people have been used to paying for a Dictionary alone, is not only a novelty in plan, but to the ordinary book-buyer the fact is hardly less than astounding. The volumes received at this office (which any reader is welcome to call and examine) are certainly deserving of the unstinted praise which they seem to be receiving. The publisher, John B. Alden, 393 Pearl-st., New York, or Clark and Adams-sts., Chicago, will send specimen pages free to any applicant, or a specimen volume (which may be returned if not wanted) in cloth for 50c., or half Morocco, 65c.; postage 10c. extra. The set of thirty volumes is offered at considerably reduced price to early subscribers.

Several things will unite to make the Christmas number of *The Book Buyer* of uncommon interest. James Whitcomb Riley has written a poem entitled "Little Johnts's Christmus" for the number; and the contributors of special reviews of the principal illustrated holiday books will be Donald G. Mitchell, Sarah Orne Jewett, Octave Thanet, George Parsons Lathrop, Prof. James Baldwin, W. C. Brownell, and Hamilton W. Mabie. Rossiter Johnson will review the miscellaneous holiday publications, and Mrs. Burton Harrison will again have charge of the children's books. The illustrations, of which there will be over fifty, will as usual, be a feature of the number. More than half of them will be printed in colors. Among the artists who will be represented are E. A. Abbey, Alfred Parsons, Howard Pyle, W. L. Taylor, W. Hamilton Gibson, F. T. Merrill, F. Childe Hassam, R. Seymour, Walter Crane, G. H. Boughton, and W. St. John Harper. The number will be ready on December 1st.—*Charles Scribner's Sons, New York.*

Catalogue No. 2 of the Lincoln Iron Works, Rutland, Vt., is a complete and excellent reference work for users of stone or marble machinery. It is a good thing to hang up in the shop. Send for it.

The first calendar of the season comes to us from E. C. Willison, importer of marble, granite and statuary, 68 Boylston street, Boston, and it is a beauty. It is a steel engraving, on heavy cardboard, representing a yacht race, and is pretty enough to fit a costly frame. We presume a copy of it may be had on request.

Friends of that charming periodical for children, *Wide-Awake*, will do well to write to the publishers, D. Lothrop & Co., Boston, for a prospectus for 1889 volumes. There are announcements of interest to all subscribers and those who may wish to subscribe.

The stone, marble and granite trades called loudly for a representative technical journal. We answered. Now give us your support.

NEW JERSEY'S MINERAL WEALTH.

Eminent geologists have said that in proportion to its area the State of New Jersey contains a larger variety of mineral deposits than any State or province in the world. Several minerals occur here in great abundance which are found nowhere else on the globe. Among the most characteristic and extensive deposits of commercial mineral are the clays of Middlesex county. The fact that there were vast fields of clay here has long been known, but it is only in comparatively recent days that practical use has been made of the knowledge. The first historical record of the clay having been used is the statement that the British soldiers quartered near Woodbridge before and during the Revolutionary War used the white kaolin to clean their buckskin breeches, calling it "Fuller's earth," but tradition says the red men used to make their peace pipes of it long before the settlers came.

A terrible accident occurred at Ellettsville, Ind., on October 22, in which George Aiken and George Johnston were instantly killed. Both men were working in the large stone quarry of Matthews Bros. The derrick was being operated by the engineer, when, without notice, the boom was taken up so high that the cap came off, allowing an arm, sixty feet in length, to fall to the ground. Both men were directly under the falling timber, and it killed them instantly. Johnston was thirty years of age, and Aiken twenty-two.

The Corona Marble Company, George F. Breed, manager, is erecting a mill building and finishing shop at the quarry in Brandon. The building is 170 by 90 feet. The company has bought ten gangs of saws and the line shafting for the mill, of the Lincoln Iron Works at Rutland. An engine of 100-horse power has been purchased. The buildings and quarry will be illuminated by electric light, the company running a small dynamo of its own. The outlay for mill and machinery will be about $30,000. The concern will employ about 75 men.

At Athol, Mass., a large tract of land at Rocky Hill, near Norcross Brothers' stoneyards, has recently been sold, and will be opened up as a quarry. A new company will be formed at once, and begin to dispose of the pink granite in the rough state or cut, and a large number of hands will be employed.

Travers, the late humorous Wall street broker, meeting Henry Clews, the banker, now an author, accosted him with: "I s-s-say, Cl-Cl-Clews, as you are a s-s-self-made man, wh-wh-why the d-d-deuce didn't you p-put more h-h-hair on the top of your head?"

A Chicago man, who had grown rich selling hams, built a country seat, but had some difficulty in finding a name to suit. A friend suggested that he call it the "Al-ham-bra."

BUILDING LAWS.

THE following extracts are from a new work on "Law of Building and Buildings," by A. Partlett Lloyd, of Baltimore, Md.

Builder's liability to his workman. It is well settled that the employer is not responsible to his employe for injuries received while engaged in the occupation for which he was employed. The courts hold to the doctrine that, as he who voluntarily undertakes to do certain work does so in view of all the dangers incidental thereto, he may be presumed to have contracted that he would hazard his chances. If he desires to avoid the risks naturally resulting from his service, he can avoid them at his pleasure by resigning, but if he remains at the work he must hazard the consequences.

The rule exempting the master from liability to his servants has been extended to those cases in which the injury results from the negligence of other servants in the same employment. But if the master works with his servants and injures one of them by his own negligence, he is responsible. So, also, where a servant is injured by another, whose service is in a distinct branch of the employment, as where a carpenter was employed on buildings and injured by the negligence of a yard-master in making up trains; but this class of exceptions is not generally recognized by the courts as an exception to the rule. Therefore a builder is not liable for injuries to his workmen caused by mechanics employed under a sub-contractor engaged in doing piece-work, or to a former employe, any one under the control of his foreman, laborers erecting scaffolding, or a volunteer assistant.

Injuries from builder's own negligence. If the builder is himself negligent, he is responsible if his negligence causes injury to his workmen, just as much as he would be if the legal status of master and servant did not exist. So where he has been informed by his employe of certain dangerous defects, and promises to make repairs but fails to do so, and the party is injured while the promise still holds good. So again, where he negligently subjects his workmen to dangerous buildings or machinery, where there are latent perils, of which they know nothing. This last statement may not be borne out in all cases, as where a railroad company was held not to be liable for an injury to one of its employes occasioned by a latent defect in one of its bridges, when competent persons had been employed to examine the bridge.

It must not be inferred from the rule just stated that a builder is bound to see that his buildings are safe beyond all contingencies, or that he exercise *extraordinary* care in guarding against accidents. Although he is in duty bound to reasonably provide for the safety of his servants, there are degrees of responsibility arising from the age, construction, and character of the buildings, and much depends upon the workman's opportunities to judge of these dangers and contingencies.

Other instances of a builder's liability to his workman arise from the following general rules: 1st. Where the master (builder) commands his servant (employe) to undertake risks the nature of which they have no reason to suspect, and which are not within the scope of their employment. 2d. Where the master (builder) is guilty of negligence in exposing persons of youth or inexperience to perils they could not comprehend. 3d. Where the master (builder) employs machinery, scaffolding, etc., which he knows to be defective, particularly if he has been warned. (He does not, however, warrant his machinery, etc., to his employes, and is only responsible when he fails to use due care in the matter.) 4th. Where the master (builder) can be shown to have been extremely careless or negligent in selecting competent workmen. 5th. Where the master (builder) promises to correct defects, upon being informed of them by the servant (employe), but neglects to do so.

A workman cannot recover against his employer if his own negligence contributed, with that of the latter, in producing the injury.

EXPORTATION OF STONE.

Slate is now being quite largely exported to Australia and New Zealand; some to England and Germany, and some to South America and the West Indies. The most extensive exportations are perhaps to Australia. School slates are quite largely sent to Germany. Marble is exported to British North American provinces, to the West Indies, and to Cuba; and the reports of the Philadelphia custom house show that in 1878 marble was exported to England; in 1849 to Belgium, England and Ireland; in 1880 to Belgium, England and Japan. Soapstone has been exported to England. Quite a large amount of Carrara marble is brought to the port of Boston, and from there distributed to the British North American provinces. The reason why this is done under the double duty instead of being shipped direct to the market where it is consumed is because large amounts of marble are shipped constantly to this country, while these other markets receive but a small amount at a time; also because ships will bring cargoes for less money to Boston than to Halifax on account of being more certain of procuring return cargo. These conditions account, in part at least, for the stone of foreign production that is shipped from the different ports of the United States.—*Government Report.*

The stone trade has no representative journal but this one. There is a moral obligation on every man engaged in the stone business to support it.

GNEISS.

A rock composed of the same constituents as granite, viz., quartz, feldspar and mica, but arranged in layers and laminæ. As to its origin, some geologists maintain that gneiss was at first a sedimentary rock—that is, was deposited by water—and that it was afterwards acted upon by heat, which caused it to assume a crystalline structure. This is the metamorphic theory. Others think that it was derived from the disintegration of granite rocks, and that the crystalline materials were then arranged in layers under water. Associated with gneiss are various other rocks, of the same general nature, in which some of the mineral constituents are replaced by others, such as hornblende, schist and mica-schist. Gneissic rocks are utterly destitute of organic remains, but are often rich in metallic ore deposited in veins. The word **gneiss** is pronounced as if spelled *nice.*—*Montana Mining Review.*

MODELING WAX.

A good composition for this purpose is, the *American Druggist* says, furnished by the following formula:

Beeswax	1 part
Lead plaster	1 "
Resin	1 "
Olive oil	q. s.
Prepared chalk	q. s.

Melt the first three ingredients together, and incorporate a sufficient quantity of prepared chalk previously triturated with olive oil to a smooth paste, to impart to the mass the requisite stiffness. The olive oil may amount to one part or a little more. If desired, the mass may be tinted with a little carmine, or carmine and and annatto, or other coloring material. Those here named will probably answer for dental purposes.

An extensive granite quarry will soon be opened at Manchester, N. H., by Col. Waterman Smith, who has found a valuable deposit on Wilson Hill.

[Contributed.]

MEMORIAL SCULPTURE—II.

RESPECT for the dead, regard for the rites of burial, and a desire to perpetuate the memory of the departed, have been distinctive of men in all ages. Throughout the various modifications imposed by the many religions of mankind, and through which came varied ideas of the state of the being, or soul, after death, men have held with unanimous tenacity to an idea, more or less intensified, of a state after death in which the person, individuality, or soul has become immortal, indestructible and immaculate. Among people of low intelligence the wants, customs and aspirations of men are concentrated upon their dead. Thus, the American Indian, or the Chinese, places at the grave of the departed those things which the latter would have preferred while alive, and which the spirit may need in the long journey to the celestial sphere.

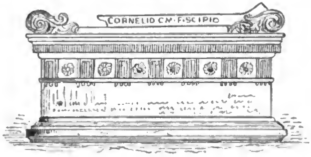


Fig. 1.

The Egyptians, who lie at the substructure of our civilization, have been mainly instrumental in the promulgation of belief in the immortality of the soul, and a corporeal resurrection, and the latter idea, wherever it became prevalent, necessarily found expression in the tenderest solicitude for the body of the deceased —its inviolate preservation in massive tombs, sarcophagii and by the process of embalming.

Concurrent with this, another school of thought arose in Mesopotamia, Palestine, Greece and Italy, which, neglecting the corporeal resurrection, placed its faith in an exalted condition of the soul, existing in a state of conscious bliss, in a higher sphere, and altogether disconnected from the body, and within these two lines the memorial necrology of civilized mankind may be traced. To the Egyptian idea of a corporeal resurrection we must ascribe their solicitude for the lasting preservation of the body—for not only were the dead preserved almost to indestructibility, but tombs of prodigious magnitude—as the pyramids, inclosed massive sarcophagii—all intended to preserve the body intact until that day when they hoped the slumbering spirit would rehabilitate its old tabernacle.

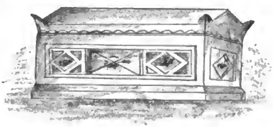


Fig. 2.

In this issue we present a few examples of sarcophagii, or stone coffins. Necessarily they are a part of, and accessory to, tombs—structures that must perforce be massive, and hence, costly—therefore they are not within the reach of the masses, and hence not popular in the accepted sense of the term. Yet the taste for them is spreading concurrently with the culture and wealth of our country, and models are eagerly sought for.

It is essential that the conception involved in these models must spring from our spiritual, or at least moral conceptions of the after life, else they will affect the imagination with a sense of inappropriateness, if not positive disgust, much as do the Hindoo or Aztec remains.

It has been objected by many critics that we moderns affect a slavish adherence to Greco-Roman models and art expressions. To this it must be answered that this is an outgrowth of Greco-Roman civilization. This is true of art, of architecture, of literature, of politics, of jurisprudence, of arms, and with but little modification, of religion as well, with all that the latter involves in our conception of the hereafter. Hence it is that we yearn, so to speak, after the ancient model.

We may be excused this digression because we wish to impress upon our art and its votaries the necessity for the expression of more natural feeling. There be no such images as are graven on human heart, and they will best succeed in stone who can best translate, or reproduce them. This will be found the secret of success in necrological art at least. Nothing succeeds like success, is an American aphorism, but success in art—our art, at least—must be successful in interpreting the unwritten language of the soul. Like the story of the Porsena family, it must appeal to something that we inevitably experience, or else it becomes a mere caricature, like the inevitable sheep usually perched upon English and American tombstones.

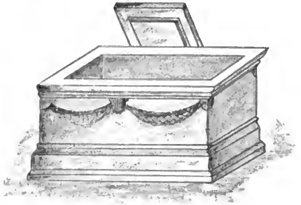


Fig. 3.

The sarcophagus of the great Scipio, Fig. 1, which is a model of elegant simplicity, and two copies from a cemetery of Dukekoma, Figs. 2 and 3, situated near Beirut, Asia Minor, so old that their origin cannot even be guessed, but have hundreds of prototypes in English cathedrals, closes our present discussion, which, however, must be modified by an expression of our opinion that the types and the prototypes are alike incongruous and ugly, and are inserted for a purpose of showing how not to do it, especially as the Scipio sarcophagus, the work of a real artist, brings this view into clear relief.

A stock company composed of Northern gentlemen have purchased the fine marble quarry, situated just one and a half miles above Charleston, S. C. Here we find seven different varieties of the finest of marble in inexhaustible quantities. A large force of hands will be put to work at this quarry in a short time, and the marble will soon be on the market.

Look over this issue carefully, and it will convince you that 12 as good and better numbers are worth $2.

CORRESPONDENCE.

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

California Stone and Marble.

To the Editor of Stone.

SIR: We send you inclosed money order $2 subscription for your paper, STONE. You would greatly oblige us if you would inform us about the following:

We are intending to open a sandstone quarry in this state. The stone is of a very fine grain, lays in regular layers of immense dimensions, splits easily and is of a light, live greenish color. On account of its structure it would be well adapted for the manufacture of flagging. The material used for sidewalks, basements, factories, etc., is here exclusively, until now, patent stone, and we would like to know how the stone, which is manufactured here for 12½ cents per square foot, which price will be about the same at your place, competes with flagging, for a material, as it would cost about three cents a square foot to lay the stone on cars at San Francisco. In case it should interest you we would send you a sample of our stone as well as a sample of white marble, of which material we are developing a very extensive ledge. The marble and sandstone are lying very near together. The marble is on the outcroppings very soft and decayed by the influence of the weather, with large crystals which are getting all the time smaller as we are going down on the ledge. We are down about fourteen feet and the crystals are no longer discernible. The top marble where any way protected has the appearance of lump sugar, pure white. In clearing the ledge we found a good many small marble boulders intermixed with the slaty (clay slate) ground in front of the ledge, which were of a yellowish color and very hard and flinty. Do you think that there is any danger that the ledge may turn from its very easy and good-working material 12 feet below the surface into flinty rock by going further down? Are there instances where such a state occurred? Hoping you will excuse the many questions we put to you we would be very much obliged for a kind reply. We remain,

Respectfully, SALFIELD & KOHLBERG.

San Francisco, Cal., Nov. 22.

Flagging rates at 50 cents per square foot in this city. In regard to the marble of which you speak we make some clippings from different sources hoping that you may gain some of the desired information therefrom. The best way to decide in regard to the value of the stone is by analysis which will determine not only the strength but the polishing and other qualities pertaining to it. It is difficult from a short written description to decide with any certainty in regard to a stone. We would be glad to see a sample of it as well as of the sandstone. With reference to the granular structure of which you speak. Writers describe the ancient marbles as having the appearance of granulated sugar, or sand in a glass vase or bottle, and this is one of the leading features of its great strength and beauty. These marbles were used in the construction of the magnificent temples and palaces of ancient times, the marble columns of which have stood the tests for thousands of years, while all the other material of their construction has long since gone to decay.

In regard to the breaking-down of the stone at the surface we quote the following from a report of the Middlebury Historical Society. The quarry in question is situated in Marbledale, Vt. It had formerly a prosperous business but work was abandoned there some years ago:

> Why the work, so well established, was compelled to give way to competition may not be plain at first view, but the cause will be mostly explained on the examination of the rock in place. The strata at Goodsell's quarry are at a sharp dip, not quite perpendicular, while the beds affording the best marble are not thick. Much unproductive stone must be removed, rendering quarrying expensive. The rock is not a pure calcareous marble, but magnesian, and through some portions minerals like tremolite and asbestos are found. The white rocks not far away from the quarries are breaking down into a white sandy mass, showing that the material does not weather well. To the character of the rock, not yielding massive blocks, and the lack of enduring quality may be largely charged the failure of the industry.

The following with reference to another quarry in the same region may be of interest with reference to the granular structure of your stone:

> The rock lies in massive beds, near the surface, and is apparently in vast quantity. The rock is white and coarsely crystalline, contains in some portions of it many crystals of tremolite and though not suitable for monumental uses, is fitted for the purpose of building to which it has been put.

With reference to the probability of the stone changing quality as you go deeper into the earth we will say that that is not an impossibility. Much of the Vermont marble was found to be of a different quality at the mouth of the quarry from what it is at greater depths. The following quotation is from a desciption of Dorset mountain in Vermont which is very famous on account of the amount of marble which it contains:

> It is stated, with much truth, that this mountain is a mountain of marble. But it must not be inferred that it stands out as a pure block of marble and can be cut into anywhere and remuneratively quarried. Comparatively, but a small part of the mountain furnishes merchantable stone, and yet this small proportion is in the aggregate immense.
>
> As one ascends the mountain he finds most of the rock obscured by debris, making it difficult to observe with certainty the real sequence of the different strata.
>
> He will pass beds of variable character, still higher, the gray interbanding with white, then the gray carrying many crystals of pyrite and films of hydromica slate, then he will miss the limestone altogether, which disappears under a debris of comminuted rock, over which have fallen many blocks of slate.

The Nebraska Association.

To the Editor of Stone.

SIR: The marble and granite dealers of this state met in convention in the city of Lincoln Nov. 15th, for the purpose of organizing an association. A temporary organization was made by electing Chas. Neidbart, of Beatrice, President and H. J. Mayer, of Grand Island, Secretary. A committee on Constitution and By-Laws was appointed. On the following day a permanent organization was effected. Chas. Neidhart was made President for the coming year, A. Heater, of Lincoln, Vice President, South Platte District, and H. J. Mayer, Vice President, North Platte District, A. H. Brown, of Red Cloud, Secretary and Treasurer.

The constitution and by-laws are substantially the same as those of the Ohio Association. Considering the number of dealers in this state, there was a good representation present. A number not able to be present, authorized their names to be enrolled as members. A goodly number of the wholesale dealers, doing business in this state, had representatives present; many others wrote encouraging words.

While there was a decided difference in views on points brought forward, the best of good feeling and kindly regard prevailed throughout the entire session. It is to be doubted if a single dealer left the convention, but felt he had been well repaid for the time and expense incurred, and had gained a higher respect for his co-workers in the trade.

No better selection could have been made for President. Mr. Neidhart has been identified with the trade in this state from its infancy; is a practical, number one workman, and is earnestly and heartily in this work to elevate our trade and business to the high plane it should occupy.

Messrs. Heater and Mayer, as Vice Presidents, will carefully and diligently look after the work in their respective districts.

On Saturday the 17th inst., the members of the Association were guests of Messrs. Heater, Kimball Bros., and Sheehey—dealers of Lincoln, Nebraska. These gentlemen provided a regimental wagon and a sober driver for the occasion. The cemeteries, state house, penitentiary, insane asylum, etc., were visited, and last but not least the respective places of business of aforesaid gentlemen.

The representatives of wholesale dealers present, were not behind the times in their royal treatment of the "rank and file" of the trade. In conclusion, if the dealers of this state pursue the same wise, conservative course as has marked the outstart, then a grand success is assured the Marble and Granite Dealers' Association of Nebraska.

Respectfully, A. H. BROWN, Sec'y.

Red Cloud, Nebr., Nov. 27.

Nebraska Leading.

To the Editor of Stone.

SIR: I take pleasure in stating to you that the meeting of the Marble and Granite Dealers of Nebraska was a very successful affair. The Committee on Constitution and By-laws, composed exclusively of retail dealers, decided by unanimous vote to cordially invite all wholesale dealers doing business in Nebraska, to join the Association, and a board of Directors was finally nominated consisting of three retail dealers and the representatives of two wholesale houses.

It is now organized with a good membership and bids fair to eclipse organizations of sister states from the fact that about every dealer in the state will undoubtedly join. Already steps are being taken with a view to legislation on the old question of holding claim on monument until payment is made. Also a good committee is now working on the matter of approaching the Inter-State Commerce Commission, hoping to correct some unjust discriminations made against the general trade in all states — as; in case of shipment of stock worth $10 per cubic foot or less, a certain rate of freight is established where a higher rate would be practically prohibitory, and then the signing of a release is compelled, the terms of which provide that in case of loss of the monument or destruction of same while in hands of railroad company the owner can only collect for the same 40 cents per cubic foot. Let us thank Nebraska for the steps taken to correct this shameful evil. A friendly and sensible letter, written the Chairman of Temporary Committee, by President James Harsha of the Ohio Association, was read and a resolution of appreciation and hearty thanks was passed.

Your periodical, STONE, was brought to notice in a resolution of thanks for your kindness in assisting in calling together the dealers of Nebraska, and a resolution was passed heartily approving of your paper as a trade journal noted for its advanced views on all questions of organization, as well as for its practical ideas pertaining to the details of working in granite, marble and all kinds of stone.

Our secretary, Mr. A. H. Brown, will in a few days forward you the minutes of the meeting. Yours very truly, ED. MACLANE.

Lincoln, Neb., Nov. 18.

NO FEAR OF BUILDING MATERIAL FAMINE.

While our lumber districts are being rapidly depleted, says the *Architectural Era*, not only by the increasing demand for lumber, but also by means of the destructive forest fires which occur with such alarming frequency, it is a source of consolation to reflect that we shall not lack for building material as long as the earth remains. The vast resources of America's stone quarries may be said to have only just begun to be developed. There is probably no computing the value and extent of the wealth which still lies undiscovered in the earth in the form of granite, sandstone, marble, and perhaps some new and more beautiful building stone than any now known. There are probably few localities in this country which do not possess somewhere in their vicinity some kind of stone suitable for building purposes.

While we deeply regret the increasing scarcity of lumber, and should be very sorry to see the predicted lumber famine realized, yet we should rejoice to see stone more largely used in the structures of the day. No material is so appropriate for churches, none so lends itself to the expression of that calm dignity and majestic repose required in ecclesiastical architecture, as grand and enduring stone.

A more general use of stone as a building material would soon cause such a decrease in its price as to bring it within reach of the masses. Stone is the most satisfactory and suitable material for the construction of all public and heavy buildings.

Every dealer can save money, and do us a favor at same time, by patronizing the progressive firms that advertise herein. Mention STONE when you write.

TEXAS STONE.

In the neighborhood of New Birmingham, Texas, there is a large deposit of peculiar stone somewhat resembling the celebrated "Caen" stone used in Paris, France, which is very soft, and can be cut as readily as chalk when first quarried, but which hardens by exposure to the atmosphere. It is a magnificent and very cheap building material. There is also a deposit of cement stone, from which hydraulic cement has been made fully equal in strength to the best English Portland cement.

The only deposit of pure limestone in Eastern Texas is near this town. It is 200 acres in extent and is located conveniently to the railroads. Its analysis is as follows: Silicious Matter 00.06; Carbonate of Lime 98.75; Sesqui Oxide of Iron 00.59.

"Did he have any organic trouble?"

"Yis, sorr. The haythin dagos played 'Swate Violets' under the windy ivery mornin', an' I believe that hilped t' kill him."

UTILIZING GRAVESTONES.

Nothing goes on in an uninterrupted career in this world, however, and even gravestones come, now and then, to strange uses. In a village in Maine, for instance, a farmer, having waxed in fortune until he was able to replace the slate gravestones in the family burial-lot by marble ones, was too thrifty to throw the old slabs away. He therefore utilized them as doorstones, so that all visitors to the kitchen and dairy trod upon inscriptions, gradually fading away, which, with scriptural phrase and the cheerful over-seeing of triangular-visaged cherubs, recorded the names, the virtues and the untimely taking off of the forefathers of the thrifty farmer.

In another Maine village is, or was, a boarding-school for young ladies, in the kitchen of which a large white marble slab sacred to the memory of a worthy woman, whom it described as having died in the Lord, was used as a kneading board. Now and then a loaf of bread after it was moulded would rest for a moment or two on the deeply-cut inscription, and the pupils averred—how truthfully the editor makes no pretence of being able to determine—that they had been able to decipher bits of the words printed on the bottom of the slices of bread.

But perhaps the most remarkable fate for a tombstone was that which befell the moss-grown slabe in an English churchyard. An American Parvenu of the same family name as that of the man whose death the stone recorded, purchased the stone of a dishonest sexton and brought it home with her. It is now set into the wall of her sumptuously appointed New York library, besides a fictitious pedigree, which lies to all beholders by tracing the family of the present owner back to that of the man whose name is on the stone. As he has been dead 170 years, he is probably beyond caring for such things, else Mrs. Parvenu might have good reason to expect a call from his ghost some night, come to reclaim his gravestone. —*Boston Courier.*

Mrs. Gusher: "O, what sweet little fawns! I do wish you would buy them for me, Charlie."

Mr. Gusher: "Perhaps I will next fall."

"But they'll be two deer then, won't they? Better not wait."

Terence—"Dinny! wud ye moind the foine church we have ericted sense ye was away?"

Dinny (with astonishment)—"Shure, it do bate the Divil!"

Terence—"Well, that was the intinshon."—*Life.*

A little girl wanted more buttered toast, and was told that she had had enough, and that more would certainly make her ill.

"Well," said she, "give me anuzzer piece, and send for the doctor right away."

Groom (in suburban village)—"We are looking for a small house; one about big enough for a young couple."

Agent—"Yes, sir. Would you like a twin cottage?"

Bride—"Horrors! No."

Judge—Do you know where you will go to, little boy, if you swear to what is not true?

Boy (of radical tendencies)—No, nor you neither.—*Judge.*

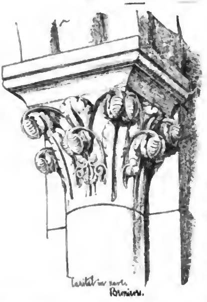
She: "What a very high-bred look the gentleman who just passed us has!"

He: "Yes; he ought to. He's a boss baker."

The Emperor of China is preparing to mop up the earth with the nations who decline to admit his subjects. He is looking out more for his queues than for his peace.

The song of the girl and the kerosene can —"Oil away, oil away to the promised land."—*Terre Haute Express.*

ROMANESQUE DETAILS.



H. H. RICHARDSON was the primary exponent of romanesque architecture in this country. None have handled it so successfully as Mr. Richardson and the students in his office, who are now continuing his business. The other architects in this country have followed, which is not so bad, except that they have been students of Richardson and not of romanesque architecture. He came to this country from his studies abroad fully equipped as an architect; he had studies in the classic style, and was quite as well versed in gothic architecture. If he had taken up one of the classic styles he would have been quite as successful as an architect as he was with the romanesque architecture. He had the education and the technical and business ability. He popularized romaneque architecture, as he could have popularized new Greek, French or Italian rennaissance. In truth, one of his best buildings and earliest works was in Italian rennaissance. It was erected in Springfield, and led to future business in that section, which finally drew him from New York to Boston. Mr. Richardson was a student of romanesque architecture of Southern France and Spain. The other architects of the country are students of the romanesque architecture which emanates from Brookline, Mass., the office of Mr. Richardson. Not but that there are those who are familiar with the history and generalities of romanesque architecture, but they have not given this architecture special study or consideration, until it was pressed upon them by the popularity that was given it by its exponents in this country.

In may be remembered that in 1872 and 1873 a Gothic architecture called by various names such as "New English gothic" "Victorian Gothic," etc., was vigorously pushed. About this time the new opera house in Paris was attracting a great deal of attention, it was finished or about finished, and the offices were full of photographs of its many beautiful details. This led to a mild interest all over the country in new Greek architecture. It was emphasized by the general trend of the French architectural publications. There are few students from the school of fine arts in this country and they have been working that way for some time. The Massachusetts Institute of Technology, then under the care of Professor Ware, in its architecturel department was doing a great deal for its students in the knowledge and practice in classic styles and the history of gothic architecture. The influence of one of Professor Ware's assistants was along the line of the new Greek architecture. The excellence of this school at that time has made its impression all over the country. But from this bit of reminiscence it is foreseen that nothing particular was said or done with respect to romanesque architecture. It is a little before this time that Mr. Richardson came on to the field. He built the Italian rennaissance building in Springfield, Mass., that we have spoken of, after that a romanesque court house, then a brownstone church in romanesque style and other work of this character. In Boston was the Brattle Square church; then came the Boston fire, this destroyed the old Trinity church. Mr. Richardson was selected as the architect of the new structure in Back Bay. By the time the church was finished, Mr. Richardson was the recognized head of romanesque architecture in this country. His popularity was fully established. Then came imitations, and those whose interests had previously been in other styles, took up the romanesque architecture as they understood it, and of course most of it came second-hand. They studied it through the Brookline office; the exceptions to this did not disturb the fact that others who had other resources did not take up this style in the spirit of intelligence that had rendered it so successful. There are other architects in the country who can handle romanesque architecture and make fewer mistakes than Mr. Richardson, but none that have been able to make the pronounced successes. There can be no doubt but that he has done a great many boyish things; these, however, were details; the general effect and most of the details were superior. Recent competitions have illustrated the spirit in which this architecture is being handled by the large majority of followers. One of the designs for the Minneapolis court house, we believe it was the one accepted, was a rank piece of copying. Copied mistakes in the same spirit that other features were jumbled. At the head of this article is a design from Berniers. It is a clean piece of work, and is presented here as a part of our scheme to give our readers and those interested with us useful designs for stone-carving. When there are so many pretty things in the world, so much that may be had by mere looking for it, it is wrong that so much that is ugly should at all times be staring us in the face.

THE STRENGTH OF ROPES.

The quality of workmanship, strength, extensibility and elasticity of round and flat ropes of hemp and aloe, and of iron and steel wire, have been experimentally investigated by A. Duboul, and the results of his experiments published in the Bulletin de la Societe d'Encouragement des Arts, Paris. In his experiments Mr. Duboul used a horizontal hydraulic press and a weighing apparatus consisting of a steelyard and sliding weight, by which tension of from one to 130,000 pounds could be recorded. For higher pressures a gauge on the body of the press was used. Specimens were fastened by winding each end on a grooved pulley of special construction. The usual length of specimens for testing was 13 feet.

The results of all the tests gave for the average tensile strengths of ropes the following:

	Lbs. per sq. inch
White hemp.	10,500 to 11,200.
Tarred hemp.	7,700 to 8,400.
White manila	9,800 to 10,600.
White aloes	5,600 to 7,000.
Flat, tarred hemp or manila.	7,800 to 8,400.

A factor of safety of 4, or even 3 in some cases, is considered safe ropes.

A rope of unannealed wire has an ultimate tensile strength of about 55,000 pounds per square inch of section of metal; when annealed the ultimate strength is reduced to about 45,000 pounds, but the elongation is nearly doubled, being 12 to 15 per cent. in annealed wire. The best wire ropes for mining purposes have a much higher tensile strength. Another writer on the same subject says that the tensile strength of a wet rope is only one-third that of the same rope when dry, and that a rope saturated with soap or grease is still weaker.

Every dollar sent us by subscribers will add to the general improvement and enlargement of STONE.

BIDDING ON WORK.

IT used to be that we heard a good deal about having the inside track on getting a contract; about having friends who would exercise their influence in favor of particular ones. This "inside track" and the friends were counted as of more account than the relative position of the bid. We have had to do with the letting of contracts on public and private work for nearly twenty years and we never in our personal experience have known the "inside track" business to work in a single case, nor was we ever able to realize that the advantage of friends was of material benefit excepting in the case of very small contracts where the results were of little value. There are cases in memory, outside of our personal experience, wherein the "inside track" business worked, and one or two where parties made money. On the other hand there are other cases which we bear in mind where heavy losses have been made after having secured a contract through favoritism. Much is expected of a man who gets a contract in this way. He is constantly annoyed by being reminded of his obligation, which leads to expense and loss. There is more of this sort of thing which has had to do with the past than the present. A man's business history has a great deal more to do with his securing a contract than the exertion of outside influence. If he is the lowest bidder everything is in his favor. Even where he is a little crooked, and known to be so, the chances are with him. People are inclined to run more or less risk in order to make a saving. In former years we heard a great deal about architects who would sell out, whose influence was purchasable. While this thing may be true at the present time to a limited extent in new communities, it is not true in the older ones. An architect who will sell out is generally small fry, one whose business is small or declining. We know of a great many offices in this country, and of their reputation. And we do not know of one that has an established business where a bid if received will not be treated fairly. Margins are too close to permit irregularities of architects to go undiscovered. Whatever their inclination may be their business sense leads them in the direction of honest procedure. The contractor who has the reputation for doing good work and the facilities for doing it at a reasonable cost is almost certain of lucrative employment. One reason why we hear complaint of dull times on the part of a great many stone-cutters is because they are not abreast of the times.

Wherever we find terra cotta works we find push behind them. We find them doing business in the year 1888 on 1888 principles. There are a great many stone-yards that have not yet passed into the forties or fifties, and that makes a good deal of difference. The man of 1840 or 1850 with the methods of that time and who steps down to this time without profiting by intervening experience is in a fair way to have trouble. There is no reason why contracting work should not be carried on the same as any other manufacturing business, with the best equipment, trained help, sufficient capital and a division of responsibility. There are several contractors in stone-work who are carrying on work in this way at this time and who have not the least trouble in securing all the business they want. We may refer among others to Norcross Bros., of Worcester, Mass., whose business originated as stone-cutters. They have the court-house at Pittsburg, the Chamber of Commerce in Cincinnati, the new library building in New Orleans, several large buildings from McKim, Mead & White's office in New York and other large structures throughout New England. They are so equipped that they can always make money. When competition is close they figure close but never at a loss; they know what every detail of their work costs them. Thus they are in a position to intelligently bid upon it. They conduct their business on a systematic manufacturing plan.

Every man, whether employer or employe, will find a year's subscription to STONE a paying investment.

STONE-CUTTING BY WIRE ROPE.

Some months ago we made mention of a foreign device for cutting stone by means of steel bands or wire rope made to run around pulleys like a band-saw. Since that time we have been investigating the matter more fully and are now in possession of full detail drawings and specifications of all that pertains to the apparatus. As soon as translations can be made from matter in hand and cuts prepared we will give all information extant upon this subject. Primarily it is well to say that the results contemplated are much more extensive than was suggested in the original articles published by us. Not only stone-cutting but stone-quarrying in all its branches, where cutting is of use, is contemplated. It is intended for horizontal, vertical or angular cutting. By cutting a channel through the bed of a quarry horizontal cuttings of any length may be made, subsequent to which the machine may be adjusted for vertical cutting. These may be regulated to any angle. In such cases it is entirely possible to cut vertically any direction into the rock and then horizontally and if desired through to the top again. While it might not be necessary to do such work at any time the somewhat fantastic illustrations shows as quarry with a central source of power and cords running in all directions, some of which are making vertical, others horizontal cuttings, again others which are transmitting power for the purpose of elevating and conveying stone blocks. Again there are those which are cutting the quarries into various finished forms. All of the details appear to have been worked out in a thorough and practical way. The means of transmission of power when under cover is by hemp rope, otherwise wire rope. The details of the carriers and tighteners are worked out in the most complete manner. Hemp rope as a means of transmitting power under cover is now coming very generally into use in this country and has long since been very generally employed in other sections. One of the interesting illustrations of the use of wire rope in cutting is the gangs where large blocks are cut into many parts. The details while most carefully worked out are of the simplest character. In the cutting from the quarry the waste is only about one-half of one per cent. and as by its use it is possible to almost entirely do away with blasting or drilling the general saving is apparent. It is said that the work accomplished is fifteen times greater than possible by old methods.

A GEOLOGICAL MAP.

Prof. John Collett, during his term of office as state geologist of Indiana, prepared a geological map in colors which cannot but be of lasting value to the state. It is on a large scale, and the various formations as they appear on the surface or in sections are set forth in color in a manner to readily illustrate the various formations. This map was published in the 1883 and 1884 reports. We have failed to notice anything so graphic and complete in the reports from other states which have come to us.

Some arts of former ages have been lost, as that of engraving on crystal stones and granite, practiced by the Ethiopians, Egyptians etc., and the art of painting on glass, practiced in the monkish ages. Different directions, too, have been given to the arts, though each is perfect in its way. Chinese art, Japanese art, Hindoo art, are each different from European, which follows the Greek standard in sculpture and the Italian in painting.

THE MEGALITHIC MONUMENT OF CARNAC.

In the French province of Brittany there still exists many relics of that strange prehistoric race which was so widely scattered over the world, if we may assume that monuments of similar form and construction indicate a similarity of race, and not, as seems more reasonable, to attribute the resemblance of these simple structures to the natural development of the human mind in widely separated countries, and in races not ethnologically connected.

The prehistoric monuments occur abundantly in Western Europe and Great Britain. The celebrated "Druids' Temple" of Stonehenge is one of the best-preserved, although it is not likely that the Druids had anything at all to do with its construction. Little or nothing is really known about these structures, and the time and purpose of their erection, and the race of men who built them, are still an unsolved mystery.

These monuments vary in size from single stones, or groups of two or three, to such enormous collections of stones as are found at Carnac in Brittany. At present there are about five hundred stones, regularly arranged to form inclosures and roads. In the sixteenth century it is said that ten or fifteen thousand stones were visible, extending over six miles of the country; but in the course of time the land has been brought under cultivation, and the stones have been removed or destroyed by the inhabitants. This vandalism until the past year, when the French government appropriated the land for the purpose of perpetually preserving this invaluable relic of prehistoric times.

It seems evident that these immense works could be of no practical use to their builders, and it is highly probable that they were either erected as memorials of departed heroes and important events, or else as temples for use in connection with their religious rites and superstitions. Whatever the motive that led to their erection, it must have been a powerful one, as the amount of work indicated by such structures as Carnac or Stonehenge must have been immensely great, especially to such savage or semi-civilized people as we conceive the men of early times to have been.

It is useless to speculate, however, upon their condition or the extent of their civilization until we have more actual information. In the case of Stonehenge, its builders must have had some astronomical knowledge, for it is so laid out, that, at the time of the summer solstice, the rays of the rising sun fall exactly upon the central "altar-stone," casting thereon the shadow of a large upright stone placed before the door. This certainly indicates a condition above that of actual barbarism. As these ancient builders toiled at their arduous task, they doubtless thought that the fame and history of their work would last as long as the earth itself; but a few hundreds or thousands of years only have since passed, and not a single fact in connection with them remains known. Who can say whether a similar fate may not befall the more extensive works of modern times, and that in a few thousand years their immense ruins may be only an object of curiosity and speculation to the people then living on the earth?—*Popular Science News.*

The foundation of the new soldiers' monument at Portland, Me., will be thirteen feet deep, with a curbing ten feet from the base eighteen feet high. The huge granite shaft will rest on the four walls of the foundation, and is to be hollow.

STONE should speak for itself to every intelligent man in the trade, and it does so speak. Hearken unto its voice, and subscribe for 1889!

A SIMPLE ANALYSIS OF GRANITE.

In granite you find at once a very different set of appearances, but after a little time you will be able to make out and to write down the following:

1. The stone contains no rounded grains.
2. It is composed of three different substances, each of which has a peculiar crystalline form. Thus one of these, called feldspar, lies in long, smooth-faced, sharply defined crystals of a pale flesh color or dull white, which you can with some difficulty scratch with the point of a knife. These are the long, white, sharp edged objects that are easily seen. Another, termed mica, lies in bright, glistening plates, which you can easily scratch, and split up into thin, transparent leaves. If you compare these shining plates with the little silvery spangles in the sandstone, you will see that they are the same material. The third, named quartz, is a very hard, clear, glassy substance, on which your knife makes no impression, but which you may recognize as the same material out of which most of the grains of the sandstone are made.
3. The crystals in granite do not occur in any definite order, but are scattered at random through the whole of the stone.

Here are characters strikingly different from those of the sandstone. You might make out of them such a short definition as this: Granite is a stone composed of distinct crystals, not laid down in layers, but irregularly interlaced with each other.—*Manufacturer and Builder.*

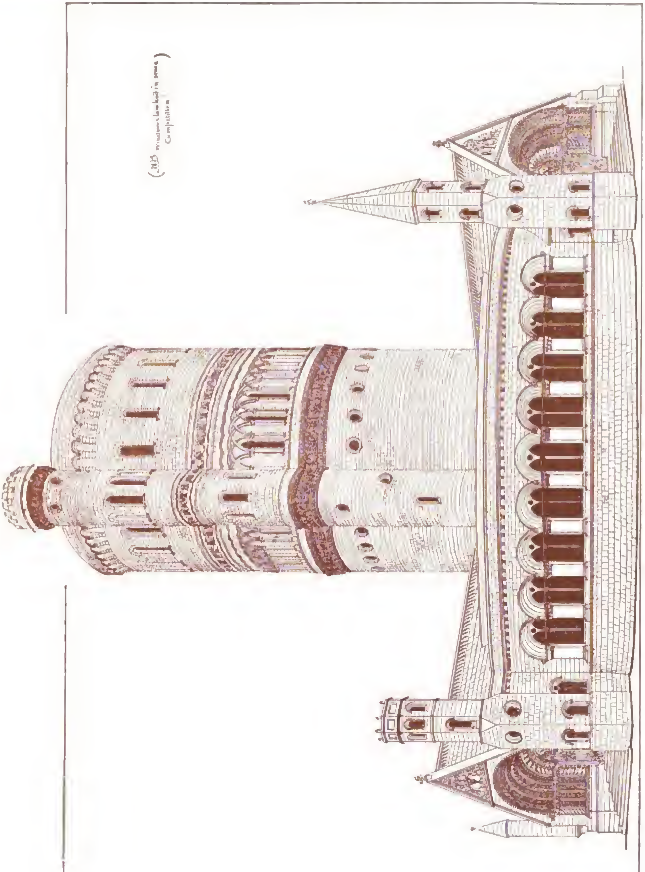
THE MATRIX OF THE DIAMOND.

The rock—a porphyritic peridotite—in which the diamonds of South Africa are contained, has been microscopically examined by H. Carville Lewis, and found to be one of the most basic rocks known having a composition of equal parts of olivine and serpentine impregnated by calcite. In this structure and in some other points it presents some analogies with meteorites. It constitutes a new rock-type, for which the name "kimberlite" is proposed. It probably occurs in several places in Europe, and is known in Elliott county, Ky., and at Syracuse, N. Y., at both of which places it is eruptive and carboniferous, and similar in structure and composition to the Kimberly rock. In most other diamond localities, where the gems are found in diluvial gravels and conglomerates of secondary origin, the original matrix is hard to discover; but in Borneo, diamonds and platinum occur only in those rivers which drain a serpentine district, and in Timor Laut they are in serpentine districts. In New South Wales, serpentine occurs near each locality where there are diamonds and the same is the case in the Urals. Diamonds have been found in the Carolinas where periodite occurs in great beds and serpentine is abundant. All the facts thus far collected indicate serpentine in the form of a decomposed eruptive peridotite as the original matrix of the diamond.—*Mining Review.*

Many of the granite firms at Barre, Vt., are working on short time, as, on account of the bad roads, they cannot get a sufficient supply of stock to keep them at work. The quarry railroad will be of great value to granite workers at such time as this, which occurs every Fall and Spring.

The Bodwell Granite Company are employing nearly 200 stone cutters, and quite a large number of paving cutters. This with the other help numbers near 500 persons and makes Vinalhaven, Me., a very busy spot.

Indiana oolitic stone is extensively used in New York City. The New York *Times* building, now being erected, is of Bedford stone.


(N.B. windows blacked in in some Competition)

DESIGN FOR INDIANA STATE SOLDIERS' AND SAILORS' MONUMENT

By R. Gambier-Bousfield, Toronto, Ont.

THE ARCHITECT AND THE CONTRACTOR.

AN old contractor, who is possessed of considerable property, and receives quite an income from it, was in an architect's office a few weeks ago and said:

"I have been contracting for furnishing stonework for a good many years, and I never worked as hard and made as little as during the last three or four seasons."

"How do you account for it?" asked the architect.

"Well, I don't pretend to account for it. All I know is that if I figure on the work at a living price I don't get it. I have got to figure it down at just about cost every once in a while to hold my men together, and if I don't get the work then I am at a dead loss, and if anything happens I lose money anyhow. So it goes. There is no margin for the unexpected."

"Don't you think the lien law has something to do with the low price of work?" asked the architect.

"No, I don't. The fact is I have saved money several times through the operations of the lien law."

"I am not so sure of that," said the architect. "I believe you have lost a good deal more money by the lien law than you have ever made."

"Well, I would like to know how you figure that out."

The architect answered: "I will go at your question by making another statement. I will say that I believe the lien law is a good thing for the people who build, because they can get their work done at cost under its operations, and that it is a poor thing for the mechanic whom it is intended to protect. Under the lien law a great many people get credit who are not entitled to it. Those who furnish material and labor have it in mind that the owner is responsible, and they will look to him in case of the failure of the contractor to provide for him, and thus irresponsible parties who do cheap work secure contracts and are able to buy material and to provide labor who, if they were thrown on their own resources, independent of the lien law, could not buy anything. In this way contractors who have capital, and are disposed to do good work, are left without full or profitable employment for their energy and capital. If there were no lien law, only those who were entitled to credit could get it."

"How about the owner; doesn't he get stuck?" asked the contractor.

"Not if he is smart."

"How is that?"

"Well, I am not smart," said the architect, "but I have had a good deal of experience. Now, I will tell you how I handle a crooked stick. I have all kinds to deal with. Say that a contractor is forced on me one way or another whom I know isn't exactly right. He comes to me and wants an estimate, or an order on the owner for money. He has a stone bill, a lime bill, one for sand and two others for labor. His price is down to about cost on work. I say to him; 'Here are releases. Take them to the people who have furnished you material and labor and bring them back signed and I will give you the estimate.' The release is in this form:

RELEASE.

"'Building and works located...
Owned by..
"'The undersigned, in consideration of the personal credit extended by us to..., Contractor, hereby consent that...
may pay to said Contractor any sum that may be now owing to or may hereafter become due said Contractor on account of..........contract for the construction of the above named Building, and we hereby waive all rights to Mechanics' Liens or other claims which we have or may have against said property on account of the labor or material furnished by us.
....'"

"You see from this form it releases all right to take a lien."

"You can't get everybody to sign that, can you?"

"Not everybody, but a good many of them. Say that the crooked stick takes out four releases and brings back two unsigned. I immediately telephose those who have refused to sign, and find out the amount of their claims. Say that the two amount to $600. The contractor is entitled to $1,600 for material and labor furnished. I charge him with $600 and give him an estimate for $1,000. The chances are four in five that the parties who have released will not get a cent of the $1,000 paid but that the contractor will go to those who have refused to release and settle up to date so as to establish credit and secure a release, in order that, as architect, I will offset the charge against him, so that the next time he wants an estimate he can come in for all that is due him for material and labor furnished on account of having given releases in full. Thus you see that before the work is finished I have got releases on everything, and if there is a loss it does not fall on the contractor or owner but upon those who furnished him material and labor. Thus you see, under the operations of the lien law, work can be done pretty low. Say that I didn't get releases from all. If I would only get two or three there would be more than enough to cover any possible loss to the owner for the reason that those who release almost invariably get short pay. It's very eassy for a contractor to establish sufficient credit to get a release when he is beginning a job, especially after the first or second estimate.

THAT KENTUCKY SPECIMEN.

In our correspondence last month a peculiar specimen of stone found near Princeton, Ky., was adverted to. The specimen sent to us for examination did not arrive in time for us to pass judgment upon it and note our conclusions in answer to the inquiries of our correspondent. We can now do so.

The stone is a quartzose sandstone of a white or pale grey color. It would prove an ornamental stone in architecture. It is very strong, and we think would prove fire, frost and weather proof. It is of excelleat quality for paving, curbstones, piers and rubble masonry, and of superior quality for such buildings as are liable to be exposed to fire or heat. It comes from a quarry divided by partings, the layers varying from a few inches to one or more feet in thickness. The partings give a stone finished at the top and bottom, hence this portion of the mason's work is avoided and the economy of its use demonstrated. We conclude that it would be a valuable stone for builders.

We are not stock brokers or rate cutters. We are journalists with modern ideas, and patrons of the trades we represent. For our commercial standing ask anybody who ought to know.

Hugh McKeevers, a quarryman at Verplanck's, N. Y., began celebrating Harrison's election by exploding dynamite cartridges at a safe distance from his house. When it began to rain hard he entered his house, still having one of the dynamite cartridges in his possession. He touched the fuse to the fire in his pipe, and attempted to throw the cartridge out of the door. It struck against the woodwork and fell back in the room. McKeevers ran into an adjoining room, where his two children, Hugh, aged thirteen, and Lizzie, aged eleven, were in bed. He threw himself on the bed and covered his head with the bed clothing. When the cartridge exploded it tore out the front and rear of the house, demolished the doors and windows and badly wrecked the furniture. The bed on which were McKeevers and his two children was blown through the side of the house, but none of them were seriously hurt. The house is completely wrecked.

JOUR CONTRACTORS.

"Sam and I have gone in business for ourselves," said a stonecutter to us the other day. We hope you can help us to get some business."

"Where is your yard and when did you make your start?"

"Our yard's down here by the track. We haven't got much to do yet, but we thought we might as well work for ourselves as for somebody else. We can certainly make more than wages for ourselves and anyhow there is some satisfaction in being our own boss. Business was a little slack in the old yard and the old man let us go, so we thought we would go to contracting."

This is a veritable instance. It is a representative one. It happens among stone-masons, stone-cutters, brick-layers, carpenters and others. The boss gets slack of work. He is compelled to let some of his hands go. Some of the more venturesome or confident ones go in business for themselves. It is right and proper for every one to do the best they can from an individual standpoint. It is a laudable ambition for one to be his own boss as it is expressed—to do business for himself. But the way that these men have done, the ones referred to in the conversation, is suicidal all around. Business is so dull that their boss with his experience and knowledge of what was going on could not keep all of his help going. These men take it upon themselves at this time when they are out of a job to go into the contracting business. Possibly they have saved a little money. They are sure to lose it. They go into business with all the chances against them. If they have the ability they can succeed when there is business to do. The greatest ability cannot succeed when there is nothing to do. In this city every year early in the spring before work opens and in the fall when work begins to get a little slack there are several such budding firms as this, and it very seldom happens that they are the best of workmen. More often than otherwise they are ambitious discontents without ability. Of course there are exceptions to this. Every firm of contractors has to bud one time or another. The ability that will succeed, however, is that which is sufficiently judicious to select an auspious time for beginning.

RUBBED WORK.

However it may be in other sections it is true that in this that a great deal of building stone is laid up with rubbed surfaces. While there may be differences of opinion in this respect it would appear to us that in the case of oolitic, or magnesian limestone, or sandstone, that the natural surface, chisseled or sawed, is the most proper. In the case of rubbing of stone of the class mentioned the pulverized granules are rubbed into the surface in a way to deaden the general tone of the surface structure, and in that way greatly injure the effect to the eye. In this city, which is adjacent to some of the best stone quarries in the country, there is very little effective stone-work. Most of it has a flat, dead, boney finish which is disappointing and is not creditable to the stone used. Chiseled work, as it is known, leaves the stone in its natural condition. The lines are clear and fine and altogether the results more satisfactory.

John I. Carr, Bar Harbor, Me., has leased a granite quarry on the western side of Somes Sound, and will keep a crew at work through the winter getting out paving blocks. Work has already begun in constructing a store, stable and blacksmith shop near the quarry.

The property of the granite company at East Milford, N. H., has been sold to F. J. Fuller of West Quincy, Mass.

REMOVING GRANITE RUST.

M. Detain sends to *La Semaine des Constructeurs* one of his sensible letters on granite, or rather on causes of discoloration of granite by rust, and the methods of preventing and removing this discoloration. In most granite countries a certain amount of iron is scattered through the rocks beneath the surface of the earth, usually in form of sulphide, crystallized in the well-known cubical, gold colored particles of iron pyrites. The crystals of pyrites occur in many other rocks besides granite, more particularly, pershaps, in slate and coal, and are frequently supposed to be gold. Wherever they occur, they decompose on exposure to the weather, leaving ultimately a free oxide of iron, which is washed by rain over the surface of the stone. Many white or mottled marbles also contain iron, which slowly imparts to the surface, under the action of the weather, a warm burnt-sienna color. This is not a serious disadvantage to marble, but in granite the iron stain combines disagreeably with the natural color of the stone, and granites containing iron particles should be rejected. According to M. Detain, the French granites of a dark grey color are rarely, if ever, affected by rust. Those with white ground are more apt to contain iron, but are tolerably safe; while those with pink or red ground are almost sure to rust. With us, red granites are no more subject to rust stains than others. There are some red granites which contain iron, but there is at least an equal number of grey and white stones with iron particles in them, and as these soon assume an unpleasant appearance on exposure, new granites should be tested. The best test, and one which cannot be too strongly recommended to architects who have occasion to try a new stone, consists in a visit to the quarry, where its merits and defects may, with a little care, be ascertained with certainty; but washing the suspected stone with muriatic acid, and allowing the acid to dry on, will often bring out the color of iron. Singularly enough, the same means answers for removing the rust stains which have already formed on a stone. The muriatic acid readily dissolves the rust, and if it is then washed off with plenty of clear water, the stain will disappear until the atmospheric influences have produced a new coat.

ROMITE VERSUS DYNAMITE.

Some comparative experiments have recently been made in Sweden with dynamite and romite, the new explosive invented by Herr S. Joberg, a Swedish engineer. The romite used was of the ordinary kind manufactured in Sweden, and the dynamite was of M. Nobel's usual make. For the experiments lead cylinders, three inches in diameter and eight inches in length, with a cavity in the center one inch in diameter and 4¾ inches in depth, were used. Cylinders were charged with romite and dynamite respectively, the charge being 230 grains. Having been provided with ordinary fuses the cylinders were tamped with dry sand, and hermetically sealed with a lead plug. They were then firmly wedged in a strong iron frame, and the charges fired. It was found that the average of ten romite cylinders in volume after explosion showed 22 2 cubic inches, against 42½ cubic inches of those charged with dynamite. This shows that the explosive force of dynamite was nearly twice that of romite. The specific weight of dynamite being also greater than that of romite, the former possesses higher concentration, which is a great advantage with explosives. The romite manufacturers, however, say that these experiments are far from being conclusive as to the relative merits of the two explosives, as, in order to give the greatest explosive force to romite, it must be inclosed in a solid case, which the soft lead cylinder is not considered to be. Further experiments with the two explosives are to be made in such a manner as may be desired by the makers of romite.—*Iron.*

A CEMETERY OF ANCIENT GAUL.

At a meeting of the French Academie des Sciences, M. Bertrand read a very interesting report upon the Gallic cemetery recently discovered at St. Maur-les-Fosses, near Paris, by M. Ernest Mace, who has presented most of the objects discovered there to the Museum of National Antiquities. The objects discovered are identical with those found hitherto in the departments formed of that part of Gaul which Cæsar allotted to the Belgians. The tombs are dug to the depth of about 3 feet 6 inches, and they vary in length from 6 to 7 feet, while in width they are from 2½ feet to 3 feet. Most of the tombs had been walled round to a height of from 12 to 14 inches to keep back the sand at the sides, and the body is placed immediately upon the sand and covered with a row of large flat stones to keep it down. In every case the bodies are laid with the face upwards, the sword in the right hand, fastened by a jointed iron belt near the head. On the right-hand side is the point of a lance, the handle of which is placed between the legs, having probably been broken as a token of mourning at the funeral. Among the other objects discovered is a sword in a good state of preservation, with the chain still attached to it. This sword is 32 inches long, the sheath being in iron, while the hilt and the guard are ornamented with three heavy nails meant to represent a sort of shamrock leaf. M. Bertrand states in his report that though it is impossible to specify the exact date of these interments, there can be no doubt that the bodies are those of warriors of Gaul, armed exactly as the warriors of the Belgian provinces were at the time of the War of Independence, while, having regard to the care taken in the arrangement of the cemetery, he comes to the conclusion that St. Maur-les-Fosses was an advance post for the defence of Lutetia. M. Ernest Mace hazards the suggestion that the bodies are those of warriors killed during the attack by Labienus upon that city, but this theory is not spoken of by M. Bertrand, whether to confirm or reject it.—*London Times.*

CONTRACT PRICES.

It is our experience that the contractors for large work make proportionately better profits than those on smaller work. For instance, take the case of a contract for a large court house. In it there is a certain door or window sill. The contractor on the court house will get more for that door or window sill than if it were placed in a small store building or private dwelling. This is true for the reason that there is a better class of business men engaged in contracting for public work. They know enough not to work without adequate pay.

Messrs. Jewett P. Cain and Gardner Gates, representing the Orvillo Marble Co., have bonded the Daniel Smith place in Clarendon Springs, comprising 67 acres, including the quarry of the marble company, to the Vermont Marble Co. The latter company will in a few days set a gang of men at work testing the marble with a testing machine. The marble will be thoroughly tested this fall, but the quarry will not be uncovered until spring. The Vermont Marble Co. will then, if the deposit proves to be valuable, set a large force of men at work quarrying the marble. —*Rutland Herald.*

At a meeting of the directors of the Vermont Marble Co., held at the company's office in New York, Mr. John P. Spaulding of Boston and Mr. Walter Scranton of New York resigned from the board of directors; and Messrs. F. C. Partridge of Proctor and Samuel A. Howard of Rutland were elected to fill the vacancies.

The firm of Elliot & Sutherland, granite cutters, at Barre, Vt., is dissolved, and the business will be continued by Elliott Brothers.

PAYING A BET.

"Mandy!" almost shrieked the elderly aunt, as she entered the parlor unexpectedly and found the young lady clasped in the arms of a young man, who was kissing her, with every indication that he had had considerable practice, "what on earth does this mean?"

"Nothing but an election bet, auntie," replied Amanda, with a look of heroic, martyr-like resignation on her lovely face; "I lost. Go on, Mr. McPelican. How many was that?"—*Chicago Tribune.*

THE TRAMP PROBLEM SOLVED.

"I don't believe in feeding tramps at the door," said Mrs. Crimsonbeak. "You feed them once and they are sure to come back."

"Well, I don't know," replied Mrs. Yeast, "I always give them bread when they come to my door, and I can't say that I ever knew a tramp to come the second time."

"Oh, well, Mrs. Yeast, you make your own bread, do you not?"

That was all that was said, and yet Mrs. Yeast went down the street like a straw hat on a windy day.

Lady (delightedly, to new boarder)—I must congratulate you, Mr. Byseps, on your ability as a carver. You dismembered that chicken beautifully.

Mr. Byseps—Thanks; I deserve no special credit. I'm a stone cutter. —*Pittsburg Bulletin.*

"My dear," said the good wife, as she looked over to where her husband was counting up his losses on the election, "who is this fool-killer the papers are always talking about?"

"How do I know?" he queried, savagely. "I never met him."

"No, James," she responded, softly, "I didn't suppose you had."

Father—"Now, my son, in a government what is the source of power?"

Young American (promptly)—"The king?"

Father—"But in a country like ours what is even more powerful than a king?"

Young American (triumphantly)—"Four kings and an ace!"—*Life.*

"I understand that Col. Blear is very wealthy."

"Well, he's worth about $100,000."

"How did he make it?"

"He made it out of coal oil."

"Indeed?"

"Yes; his first wife lit the fire with kerosene and he got all her money."—*Lincoln Journal.*

"Don't you see that sign up there?" asked the grocer, pointing sternly to a placard on the wall bearing the fateful words: "No Credit Given Here."

"Yes," replied the man, who had just asked for a barrel of flour on tick, "I see it. But how about the other sign up there on the other side; "If You Don't See What You Want, Ask for It."

"Biggins makes me tired. I never saw such a crank on homeopathy in my life."

"Is that so?"

"Yes. You know he has the hay fever every summer, and now he's going to marry a grass widow on account of it."—*Terra Haute Express.*

"What is man?" sighed Haroun Al Raschid.

"To-day," says an American paper, "he is here and to-morrow he is in Canada and the next day nobody knows where in thunder he is."

CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT.	STRUCTURE	COST.
New York City	Sam'l Hinman	Geo M Walgrove	Residence	$ 36,000
New York City.	B Lynd	Jno Duncan	Flat	
New York City.	Jno. D. Karst	Alex J Finkle	Flat	60,000
New York City.	John Schmoring	Jas Stroud	Flat	21,000
New York City.	J. C. Barth	J C Barth	Flat building	36,000
New York City.	Michael Fay	Rentz & Lange	Residence	20,000
New York City.	M Coogan and James Riley	Cleverden & Putzel	Apartment Building	20,000
New York City.	David Millikan	Andrew Spence	Store building	16,000
New York City.	Yetta Goldstein	J A Reamer	Flat	15,000
New York City.	Peter Herter	Herter Bros	Store and Flat	30,000
New York City.	J. P. Schwartzler	Ed Wenz	Tenement building	50,000
New York City	Harry Muldoon	J C Burne	Flat building	52,000
New York City.	Thomas E Cook	J C Burne	Flat	36,000
Chicago, Ill.	Jul De Horvath	Jul De Horvarth	Residence	10,000
Chicago		Jul DeHorvarth	Police station	20,000
Chicago	W M Wilson	W L Carroll	Flat Building	11,000
Chicago	Mason & Houghteling	H Huber	Improvements	80,000
Chicago	Gwynn Garnett	M E Bell	Residence	10,000
Chicago	Judge Altgeld	Flanders & Zimmerman	Building	50,000
Chicago		Wm Stripqleman	Factory	100,000
Chicago		Wm Strippleman	Apartment Building	80,000
Chicago	J N Campbell	C A Weary	Residence	17,000
Chicago		Wm Strippleman	Residence	80,000
Chicago	J V A Weaver	L Gustav Hallberg	Flat	15,000
Chicago	Mrs Mary C Meadowcroft	L Gustav Hallberg	Flat building	15,000
Chicago	S K Martin	J A Thain	Residence	80,000
Chicago		Wm Strippleman	Apartment Building	100,000
Kansas City, Mo	F A Hornbeck	T B Hamilton	Business Block	10,000
Kansas City,	M W Halsey	Matthews & Sanders	Residence	15,000
Kansas City,	R S Vivian	Iner & Byram	Residences	70,000
Kansas City,	A W Browerton	Max Scholer	Residence	24,000
Kansas City,	S B Frink	A B Cross	Residence	30,000
Kansas City	Frank Campbell	F J Hart	Residence	10,000
Phila Pa	G F Currie	Paul Brandner	Business block	15,000
Phila Pa	W J Lewis	T G Evans	Store and office building	50,000
Phila Pa	C B & R M Hand	W S Frazier	Store Building	15,000
Hutchinson, Kan	Underwood & Co		3-story packing house	100,000
Savannah, Ga	The Tybee Beach Hotel Co.		Hotel	40,000
Milwaukee, Wis	A Prostel	H P Schnetzky & Co	Building	25,000
Grant Park, Ga	Col L P Grant		Hotel	100 000
Louisville, Ky	South. Bapt. Theological Seminary		Library	50,000
Wilkes Barre, Pa	Trustees Osperhoult Library		Library	150,000
Findlay, O.	A B Shafer		Business block	10,000
Findlay,	Wm. Kramer	Geo Horn	Block	10,000
Findlay,	D D French	Geo Horn	"	10,000
Findlay,	Dr. A L Davis	Geo Horn	"	15,000
Kansas City, Mo	A A Castland	Nier & Byron	Residence	12,000
Kansas City,	Maurice Landman	A B Cross	Store and Flat	120,000
Kansas City,	J T Blake	R B Maybeck	Residence	9,500
East Orange, N J	Mrs A Walters		"	14,000
Newark, N J	James Bowers	H D Havell	"	28,000
Boston, Mass	Peter Graffan	F K Bakie	4 Apartment Buildings	250,000
Brooklyn, N Y	Wm H Norris	Wm H Norris	Flat Building	10,000
Brooklyn,	O Nilseen	O Nilseen	Tenement house	20,000
Brooklyn,	Thos. H. Robbins	Amzi Hill	Block	30,000
Brooklyn,	S R Walters	J D Reynolds	Residence	25,000
Auburn, Ill		Jul De Horvath	School-house	25,000
Covington, Ky	C & O R R Co	A O Elzner	Depot	9,000
Joliet, Ill	B F Fuller	Ackerman & Starbuck	Residence	10,000
Englewood, Ill		Jul de Horvath	Police Station	20,000
Auburn, Ill		Jul de Horvath	School-house	25,000
Auburn Park, Ill	Jul De Horvath	Jul de Horvath	Residence	10,000
Atchison, Kan	Senator Ingalls		"	25,000
Phila, Pa	Penn Mutual Ins. Co		Business building	300,000
Sioux City, Ia	Mr. Cheney	G C Baldwin	Residence	15,000
Stockton, Mich	The Pioneer Society		Hall	30,000
Leavenworth, Kan	Leavenworth Mfrs Bank Bldg. Ass'n		Bank building	30,000
Fremont, Neb	The County		Court house	60,000
Denver, Colo	Y. M. C. A.	John R Hanna	Building	150,000
Newark, N J	Board of Educatio	Chas P Baldwin	School-house	30,000
Hastings, Neb			Sisters' Academy	60,000
Camden, N J	North Bapt. Church Society		Church	70,000
Denver, Colo	Sisters of Loretto	J M Berkey & Co	Academy	225,000
Nyack, N J	The Presbyterians	Rev George Schnmaker	Church	12,000
Atlanta, Ga	Second Baptist Church Society		Church	74,000
Bridgeton, N J	The Central M E Church		Church	14,000
Franklin, Wis	The German Reform Church		Church	25,000
Minden, Neb	The Catholics		Church	30,000
Detroit, Mich	Michigan Wire & Iron Works		Factory	12,000
Riverside, N J	Helvetio Silk Co	F Wm Rumpf	Factory	22,000

LOCATION.	OWNER.	ARCHITECT OR SUPERINTENDENT'	STRUCTURE.	COST.
Washington, D. C.	Chas H King & Geo E Emmons		Residences	$ 85,000
Easton, Md.	Edw H Roe		Hotel	50,000
Tybee Beach, Ga.	The Tybee Beach Hotel Co		Hotel	40,000
Nashua, N. H.	The City		Soldier's monument	13.000
Topeka, Kans.	Electric Railway Co	Hadley & Cooper	Buildings	50,000
Franklyn, Mass.		S S Woodcock	Memorial hall	40,000
Allegan, Mich.	The County	Chas L Bartlett	Court House	45,000
Memphis, Tenn.	Amateur Athletic Ass'n	Edbrook & Bernham, Chicago	Building	40,000
Fort Worth, Tex.			College	125,000
Portsmouth, Va.	Central Church		Church	10,000
Norwich, Conn.	Central Baptist Society		Church	50,000
Philadelphia, Pa.	Edw R Wood	Frank M Day	Residence	40,000
Norwich, Conn.	Y M C A		Building	75,000
Topeko, Kans.	Mr Joseph	Hadley & Cooper	Business Block	20,000
Louisville, Ky.	E F Goodwin and others		Club Building	30,000
Washington. D. C.	Mrs J M Lang		Apartment House	16,000
Richmond, Va.	Joseph R Anderson		Hotel	200,000
Cleveland, O.	L T Dellenbaugh	C. T. Sweinfurth	Residence	10,000
San Francisco, Cal.	Moses Rosenbaum		Business Block	75,000
Minneapolis, Minn.	E F Webster	Orff Bros.	Tenement Building	36,000
Findlay, O.	Jason Blackford	Kramer & Zoll	Business Block	15,000
Findlay, O.	Syndicate Block Co	Geo Horn	Business Block	25,000
New York City	A B Yetter	A. B. Yetter	Storage Building	15,000
Findlay, O.	Swing. McConica & Co	Kramer & Zoll	Factory	10 000
New York City	P McCormick	J. M. Dunn	Storage house	10,000
New York City	Oscar Hammerstein	J. B. McElfalrick & Son	Theatre	180,000
Mansfield, O.	The Presbyterians		Church	30,000
Oakland, Cal.	Y M C A		Building	50,000
Butte City, Mont.	John Maguire	J. S. Chevigny	Theatre	40,000
Broken Bow, Neb.	The City		Court House	20 000
Broken Bow, Neb.	The City		Jail	10,000
Hillsdale, Mich.	The County	S W Yeagley	Court House	60,000
Chicago, Ill.	Mr Meyers	C T Freijs	Residence	10,000
Chicago, Ill.		F. B. Townsend	Flat Building	15,000
Chicago, Ill.	F H Campbell	W. D. Cowles	Dwellings	20,000
New York City.	P Kottowsky	Schneider & Herter	Flat Building	75,000
New York City.	S Inslee	S. A. Warner	Store Building	30,000
New York City.	D Richter	Buchman & Deisler	Business Building	10,000
New York City.	Walter S Price	Cleverden & Putzel	Flat Building	112,000
New York City.	Isaac E Wright	Cleverden & Putzel	Residences	54,000
New York City.	Geo W Eggers	E. I. Angell	Flat Building	75,000
New York City.	Chas Downey	A I Finkle	Flat Building	36,000
New York City.	Kelley & Roberts	C. A. French & Co	Tenement House	28,000
New York City.	Annie Davies	Andrew Spence	Flat Building	30,000
Boston, Mass.	Mr S M Sharpleigh	J. H. Beserick	Residence	10,000
Brooklyn, N. Y.	J A Bells	E B Langston	Residences	43,000
Boston, Mass.	S M Sharpleigh	J. H. Beserick	Residence	12,000
Boston, Mass.	Fred'k L Ames	Fred'k L Ames	Flat Building	40,000
Cincinnati, O.	Herman Lackman	G & A Brink	Flat Building	11,000
Kansas City, Mo.	S J M Linden and F C Fales	T. J W Hart	Residences	78,000
Kansas City, Mo.	Mrs M L Simpson	J C Sunderland	Residences	20,000
Chattanooga, Tenn.	Lookout Mountain Co	Thomas Sully	Hotel	
Cloquet, Minn.	C N Nelson Lumber Co		Block	40,000
Minneapolis, Minn.	A K Taylor		Tenement House	45,000
Toronto, Can.	T Taylor	G R Harter	Residence	15,000
Paris, Ky.	Ford & Varden		Hotel	15,000
Lexington, Ky.	L & G Strauss		Store Building	14,000
Boston, Mass.	Thompson & Feldmar	Sam'l D Kelley	Apartment House	90,000
Boston, Mass.	E B Horne	Architect Kelley	Apartment House	40,000
Chicago, Ill.		Will A Freret, Washington, D. C.	Appraiser's Warehouse	30,000
Kansas City, Mo.	A A Castland	Nier & Byron	Residence	12,000
Roanoke, Va.	B C Moomon		Business Building	20,000
Norfolk, Va.	U S Gov	J. Mills Brown, Washington, D. C.	Repair Granite Sea Wall	
Waxahachie, Tex.	Masonic Temple Ass'n		Building	30,000
Forth Worth, Tex.	The Odd Fellows		Temple	35,000
Chattanooga, Tenn.	Union R R Co		Roundhouse	
Washington, D. C.	Columbia Athletic Club		Club Building	30,000
Pocomoke, Md.	Benj C Pearce		Hotel	20,000
Baltimore, Md.	The City	J. T. Oster, Insp.	School building	
Baltimore, Md.	Francis White		Warehouse	
Paris, Ky.	Ford & Varden		Hotel	15,000
Louisville, Ky.	Commercial Club, Building Co		Club house	350,000
Lexington, Ky.	Thos Cassell		Stores	8,000
Lexington. Ky.	L & G Straus		Stores	14,000
Arcadia, Fla.	The County		Court House	
Macon, Ga.	Manchester Mfg Co		Factory	100,000
Atlanta, Ga.	Rich & Dan R R Co		Union Depot	
Marianna, Ark.	The County		Court House	
Little Rock, Ark.	Herman Kahn		Residence	10,000
Montgomery, Ala.	Montgomery Brewing Co	Davis Bros	Factory	
Birmingham, Ala.	The Methodists		Church	
Philadelphia, Pa.		I H Hobbs & Son	Residence	10,000
Bryn Mawr, Pa.	R W P Goff, Phila Pa	T. Frank Miller	Residence	15,000
Philadelphia, Pa.		G T Pearson	Residence	25,000
Worcester, Mass.		Fuller & Deland	Armory	80,000
Philadelphia, Pa	Bell Telephone Co	Addison Hutton	Office Building	75,000
Duluth, Minn.		E. P. Bassford, St. Paul	Union Depot	275,000

PRICE CURRENT.

ARTIFICIAL STONE.
(C A. Stevens, Lansing, Mich.)

	Sq. ft
Sidewalks	12¼c
Building stone, plain	20 n

BLUESTONE.
(Lord & Griswold, Chicago.)

New York	45c
Wyoming Valley	45c

BLUE FLAG STONE—

(J. G. Barger, Goodyear's, Cayuga Co., N. Y.)

Prices f. o. b. Atwater, on L. V. R. R. and Cayuga Lake.

Rough and Wavy Flag.	Sq. ft.
2, 3 and 4-ft. size	5c
5 and 6 "	6c
Split Flagging.	
2 and 3-ft. size	6c
4 "	7c
5 and 6 "	8c
Smooth Split Flagging.	
2 and 3-ft. size	8c
4 "	9c
5 "	10c
6 and 7 "	11c
Solid Rock, per cubic foot	50c
Platforms, 4 in. thick.	Sq. ft.
Less than 25 sq. ft.	16c
25 and less than 40 sq. ft.	20c
40 " 60 "	25c
60 " 65 "	30c

Platforms containing more than 60 sq. ft. prices given on application. For platforms more than 4 in. thick, add 6c per inch for every inch over 4 inches up to 8 inches; over 8 inches thick prices given on application. Special advantages for furnishing large platforms.

For planing and jointing, per sq. ft.	25c
For planing, jointing and heading, per sq. ft.	30c

[Forest City Stone Co., Cleveland, O.,]
(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches,	20
	Sup. ft.
Flagging—	
4 to 6 inches thick, natural bed, any size up to 12 ft. long	12c

EUCLID BLUE AND COLUMBIA SANDSTONE—

Sawed Flagging.	
1 in. thick	10c
2 "	10c
2½ "	12c
3 "	14c
4 "	18c

BROWNSTONE—	cu. ft
Ohio—No. 1 Promiscuous blocks	60c
No. 2 " "	50c
Ashland, Wis.—Promiscuous blocks	80c
Connecticut—No. 1 " "	95c
No 1 " "	85c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	40
No. 2. " "	30c
No. 1. Monument Bases, broken to size	45c
No. 2. " " " "	35
Engine beds, broken to size,	40
Perch or Wall Stone, per ton railroad weight	50c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	60

NORTH RIVER BLUESTONE—

(Union Bluestone Co., New York.)

Flagging.	
Rough Flag, promiscuous sizes	$ 9
Smooth " " "	10
2 and 2.6 Smooth Flag, 1¼ in. and over	12
2 " 2.6 " under 1¼ in. thick	11
3 " 3.6 " 1¼ in. and over	13
Cess-Pool Flag, 2 to 2.6 in. square, 3 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1¼ and under 1¾ in. 2 ft. and over wide, wide	16
4 and 4.6 in. smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in.	23
5 ft. " " " 3 in.	25
5 and 5.5 Smooth Flag, 2 in. and over	17
5 and 5.6 " " under 2 in.	15
6 and 6.5 " " 2 in. and over 18	18
6 and 6.6 " " under 2 in.	16
Well Stone, 2 to 3½ in. thick, 4 to 4.6 in. square	24
Well Stone 3 to 3½ " 5 to 5.6 "	28

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag.	
6 ft. to 6.6, x 3 to 5 ft. wide	$ 22
7 ft. to 7.6, x 4 to 6 ft "	24
8 ft. to 8.6, x 4 to 6 ft. "	26

The above to be 2½ inches thick.

Promiscuous Large Flag.	
30 to 50 ft. 6 in. thick	28
50 to 70 "	38
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thickness at special prices.

For planing add 22 cents.

For rubbing add 35 cents.

Window Sills and Lintels.	
6 x 8 in. Quarry cut	22
4 x 8 in. " "	24
5 x 8 in. " "	29

½ in. allowance in thickness.

Door Sills.

6 x 12 in. Quarry cut }
6 x 14 in. " " } 3½ cts. per in. in width
5 x 16 in. " " }

8 to 10 ft. long, add 10 cts. per foot.

Curb, Quarry Cut.	
Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in. thick	27
14 " under 4 in. "	28
14 " 4 in.	32
16 " bev'd, under 3¾, 3 ft. and over, long	31
16 in. Curb, 3¾ to 4, 4 ft. and over, long	33
18 " 3¾ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	55
16 in. Corners, per set	5 60
20 " "	8 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.	
12 in. gutter, 6 to 6½ in.	17
12 in. " thin	14
14 in. " 6 to 3½ in. 3 ft. and over, long	20
14 in. " thin, 2.6 and over, long	18
16 in Belgian Bridge, 4 in. thick	44
20 in. " " 4 in thick	55
24 in. " " 4 to 4½ in	65
24 in. " " 6 to 6 in	77
24 in. " " 7 to 8 in	90
19 in. Bridge Flag Joints, 3½ in.	28
20 in. " " " 3½ in.	40
24 in. " " " 4 in.	50
Coping.	
11 in Coping, 6 to 8 in	22
14 " 2½ to 3 in	29
16 " 6½ and under 3½ in.	40
16 " 3½ to 4 in	45
16 " 3½ to 4 in	50

20 in. to 36 in. Coping, 4 in. thick, 6¼ cents per in. in width. When ordered over 4 in. thick, special price, will be given.

When ordered under 4 in. thick, 6 cents per in. in width.

Steps.	
6 x 12 in. promiscuous lengths, under 8 ft.	50
7 x 12 " " " "	60
6 x 12 " " " "	70
7 x 14 " " " "	70
6 x 14 " " " "	75

8 ft. and up to 10 ft. long, add 10 cents per foot.

Rock.	
Promiscuous Rock, per in. in thickness	9
Dimension Rock, per in. in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 inches Thick	
Under 20 feet	30
20 feet and under 35 feet	35
35 " " 50 "	50
50 " " 60 "	56
60 " " 70 "	65
70 " " 80 "	76
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price

Above, if dimension both ways, add 10 per cent.

For 5 in.	add	10 cts.
" 6	"	20
" 7	"	30
" 8	"	40
" 9	"	56
" 10	"	65
" 12	"	100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.	
4x6 in.	48
6x8 in.	50
5x9 in	60
5x12 in.	77

½ in. allowance in thickness.

Rubbed Lintels.	
6½ to 4 x 10½ in. under 8 ft.	48
8 ft. and under 10 ft.	60
4 in. x 13 in. under 8 ft. in length	67
Rubbed Curb.	
2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in.	48
12 " " " 4 in.	55
Rubbed Mantels.	
4 x 10 in.	55
4 x 12 in.	65
4 x 14 in.	75

Dimension lengths with heads, measure heads.

Rubbed Hearths.	
3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4.6 in. long, 1.4 to 2 ft. wide	33
" 4.6 to 5.6 " 1.4 to 2.6 in wide	40
" 5.6 to 6.6 " 1.4 to 3 ft. wide	45
" 6.6 and under 8 ft long, 2 to 4 ft. wide	65
Rubbed and Jointed Tile.—Boxed.	
Under 2½ in. thick, 12 to 30 in. square, per superficial ft.	55

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.	
3 ft. and 3 ft. 6 in., 1 ft 8 in. and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 5 " 5 " 6 " "	39
6 " 6 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cemetery and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

Trade discounts on application.

BROWNSTONE.
(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, unless otherwise mentioned.]

	Cu. ft.	
Carbondale, light	70c.	f. o. b. quarry
" dark	95	" "
Hummelstown	45	" "
Lake Superior { Marquette	1 00	" Chicago
Lake Superior { Rain Drop	1 00	" "
Trenton	50	
Linden	50	
New Brunswick	45	
Kibble—Massachusetts	65	

OHIO BROWNSTONE—

	Cu. ft.
Killbuck	45c
Gann	45c
No. 1. Promiscuous blocks	45c
No. 2. " "	30

Stone ordered to dimension sizes 10 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT BROWNSTONE—

(Middlesex Quarry Co., Portland)

	Cu ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	55
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft. and over, price to be agreed upon.	
	Superficial
Door sills under 2 ft. wide, 6 in. thick, one edge under 7 ft long, promiscuous sizes	63
Platforms, Cornice, etc., 7 to 6 in. thick, under 16 superficial feet	85
Platform, Cornice, etc., 16 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	1 12
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashler, under 4 in. thick	20
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 6 ft. long, promiscuous lengths	50
Coping, 12 by 8 in. promiscuous lengths	63
Steps, Lintels, etc., 14 and under 18 in. wide, 6 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 6 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu. ft.	1 50
" " 20 cu. ft. and over, price to be agreed upon.	
Monumental Stone, 8 to 12 in. thick, charged 12 in.	
Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in thick	56

Discount 5 per cent.; cash or approved Notes, at two months.

FREESTONE.
(Lord & Griswold, Chicago)

New Brunswick brown	.45c
Buena Vista	.40
Ohio	.30
Long meadow, brown	.60

GRANITE.
(Lord & Griswold, Chicago.)

Westerly	
Monson	.65c
Woodstock	.65c
Mica Stone	.50c
Port Deposit	.65c

GREEN STONE.
(Lord & Griswold, Chicago.)

Pennsylvania	.50c

LIME, CEMENT, ETC.
(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs.	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	50
Portland " imported, " barrel	6 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " 1 " " " "	
Fire brick Savage per 100	
" " Aetna " "	4
" " Montezuma " "	2 50
" " West Virginia " "	6 00
Ground fire clay, best, per bushel	1 00
" " " common " "	

Discounts	
Vitrified sewer pipe	50 per cent.
Fine Pipe for Chimneys	25 " "
Terra Cotta Chimney Tops	25

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f.o.b. Erie.

LIMESTONE.

(Lord & Griswold, Chicago.)

	Cu ft.
Salem, Bedford	25c f. o. b quarry.
Oolitic, " buff	25 " "
" " blue	25 " "
Oolitic Bowling Green	25 " "
Artesian	35 " "
Grafton	25 " "

MAGNESIAN—

[J. A. Green, Stone City Iowa.]

Dimension Stone —(First Quality of all ordinary sizes.)

12 inches and over, per cubic foot	$ 35
11 to 12 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17

Vault covers—(Large size.)

7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25

Flagging Stone—(Ordinary size.)

5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10

Bridge Stone.

Common, per cubic yard	$ 2 50
Coppings, " " "	6 75
Pedestal Bases, per cubic yard	6 75

Footing Stone.

Dimensions, per cubic yard	$ 3 25
Common, " " "	2 50

Rubble or Building Stone.

Common Rubble, Per 100 lbs	2½c
Select Rubble, " 100 "	3½
Rock Rubble, " 100 "	4
Drilled Rubble, " 100 "	6

Street Crossings.

5 to 6 inches, per superficial foot	$ 15
Curbing, 5 to 6 inches thick, per superficial ft.	15

Cut and Rubbed Stone—(Finished. Ready to lay in their place.)

Ashlars per sq. ft. measuring all that shows	$ 00
Base	70

Corner Blocks

Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
525 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
360 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

(Lord & Griswold, Chicago.)

JOLIET	Rubble, $4 cord; dimension 30c
Planed sidewalk, Chicago	64c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@1.00

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@1.00

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30	13	65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts. per superficial foot extra.

Stone over 10 feet long and 5 feet wide, 10 cts. extra per superficial foot.

Rough Stone.

Mill Blocks as quarried, per cu. ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc.	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $10 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft.	15c
Promiscuous good select Bridge Stone, cu. ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes	5 " "

Good Range Rubble, from 6 to 6 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 3 per ct., on rough and dimension, and 5 per ct. on sawed.

[Big 4 Limestone Co., New Point, Ind.]

Prices on cars at quarry, the buyer paying freights.

Flagging for Sidewalks.

	In Rough.	Jointed.	Jointed and 4 cut Hammered
3-inch	10c	13c	20c
4 "	16c	21c	26c
5 "	17c	22c	27c
6 "	18c	24c	30c
7 "	22c	28c	34c
8 "	24c	30c	36c
12 "	26c	32c	39c
10 "	28c	34c	42c
11 "	30c	36c	44c
2 "	32c	40c	45c

2c extra when over 14 feet long or in strips less than 2 feet broad.

Platforms.	In Rough	6-cut Face, 8-cut Edges.	8 cut Face 10-cut Edges
6-inch	22c	56c	65c
7 "	24c	58c	65c
8 "	28c	58c	65c
9 "	30c	58c	65c

Block Stone.	Cu. ft.
12 inches thick or over	—
Irregular sizes, 20x70 ft.	30c
Special sizes	33c
Bases	33c

Block stone less the 12 in. thick at Flagging Prices.

Bridge Stone.	Ton of 2,000 lbs.
First-class, dressed	$2 25
" undressed	1 30
Second-class	1 00
Coping, 12 in. thick and over	2 15
" less than 12 in. thick at flagging prices.	

Building stone.	Ton of 2,000 lbs.
Riprap	$0 25
Ordinary Rubble.	80
Range Rubble (select)	1 00
Scrap Flagging	1 50

Range stone 6 to 10 in. thick, 6 to 10 in. wide, 18c lin. ft.

Jail Stone.	6-cut Hammered.
6-inch, one side dressed	34c
both sides dressed	46c
7-inch, one side dressed	38c
both sides dressed	50
8-inch, one side dressed	44c
both sides dressed	54c
9-inche, one side dressed	46c
both sides dressed	58c

Door Sills and Steps.

6-inch, per sup. foot in rough	Sq. ft.	20c
7 " " " "	"	25c
8 " " " "	"	30c
Ordinary dress, 6-cut edge, 4 cut face	Sup. ft.	50c
Extra dress, 8 cut edge, 6 cut face	"	58c
" " 10 " " 8 " "	"	65c
Sawed sills of all kinds per sup. foot		—

Strips less than 12 inches wide same price per lineal foot as Sills and Steps are per superficial foot.

Culvert Covering and Footings.

Same price as Footings.

Irregular sizes	8 to 9 in. thick, 11c	10 to 12 in. 12c
Dimension "	8 to 9 in. thick, 13c	10 to 12 in. 14c

Crushed Stone.

In orders for 25 cars and over	35c per ton.
" of less than 25 cars	40c "

Invert Stone for Sewers.

9x20 in.x2 ft. radius	90c lineal foot.
9x30 in.x3 ft. "	90c "

Pier Stone.

Stone in rough, 25c per cubic foot.

The thickness optional with consignor.

If dressed, add to price of stone in rough for bedding and pitching face, 15c per cubic foot. For bedding and tooth axing face, 25c per foot face measure.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	16
3 " " " "	12

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	22
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $1.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing.

10 to 12 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone.

$3 to $4.50 per cubic yard.

Rip Rap.

$1 to $2.50 per car load.

MARBLE.

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial in.							Monumental.
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Dark Veined Blue	25	30	35	40	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	45	55	82	1 10	4 00
Ex. Dk. Veined Blue	35	40	[illegible]	[illegible]	[illegible]	90	[illegible]	4 50
Ex. Dk. Mottled Blue	40	45	55	[illegible]	70	1 [illegible]	1 [illegible]	5 00

Dark blue base strips and posts, per cubic foot	$1 75
Dark blue bottom bases per cubic foot	1 75
Dark blue bottom bases defective, per cubic foot	1 25
Dark blue markers, 0.10 to 1.2 long, 3 in. thick each	50
Dark blue markers, 0.10 to 1.2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 8 in. wide, assorted sizes each	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra cubic foot	50
Strips ordered 7 0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing per cubic foot.	35
Boxing " "	25

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental
Statuary	90	1 15	Same as 2 inch	1 25	2 00	2 70	4 60
No 1	75	90		1 10	1 65	2 20	6 50
Average	60	70		75	1 12	1 50	5 25
No 2	40	45		55	72	1 10	4 25
Rutland Italian	30	35		55	82	1 10	4 25
Mottled Smith	....	....		40	60	80	3 50
Best No. 3	27	32		35	52	70	4 00
No 3	18	22		25	37	50	2 00
Extra dark and mottled blue	45	5[illegible]		60	90	1 20	4 50
Dark blue	30	35		50	75	1 00	4 50
Light blue	20	25		30	45	60	2 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in inches.	Diam. Bowl in Inches	Rutland Average & P. D. M. V. Mount Dk. No. 1	R'tl'd No. 3 ex dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled & Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue Suth'l'd F Best No.	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	3 40
8	5	2 90	2 85	2 75	2 65	2 55	3 65
9	5	3 15	3 05	2 95	2 85	2 75	3 75
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 60	3 60	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	3 93	3 70	5 50
14	6	4 80	4 60	4 20	4 10	3 80	5 70
12	7	5 15	4 85	4 55	4 35	4 15	5 75
13	7	5 35	5 05	4 75	4 55	4 35	6 35
14	7	5 85	5 25	4 56	4 65	4 45	6 60
15	7	5 50	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 60	6 20	5 80	5 60	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 10	7 40	6 90	6 40	6 00	8 90
16	9	8 60	8 10	7 50	7 00	4 60	9 50
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 50	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 50
18	10	11 35	10 35	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 35	14 25
24	10	13 75	12 45	11 35	10 35	9 55	15 75
18	11	18 75	12 65	11 55	10 65	9 95	15 85
20	11	14 65	13 25	12 15	11 15	10 35	15 85
22	11	15 55	13 95	12 75	11 65	10 85	16 85
24	11	16 25	14 65	13 35	12 15	11 25	17 85
18	12	15 65	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 80	17 95
22	12	17 75	16 05	14 65	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 35	13 15	......
28	12	20 65	18 45	16 55	14 95	13 65	......
24	13	21 20	19 00	17 10	15 50	14 20	......
26	13	22 60	20 10	18 00	16 20	14 80	......
28	13	23 80	21 20	19 00	17 10	15 60	......
30	13	25 10	22 30	19 90	17 90	16 30	......
24	14	25 80	23 20	21 00	19 10	17 00	......
26	14	27 40	24 70	22 30	20 30	18 70	......
28	14	29 00	26 20	23 60	21 40	19 70	......
30	14	30 90	27 70	24 90	22 50	20 70	......
32	14	32 20	29 20	26 20	23 70	21 60	......

Hearths, 1 in., sawed edges, per sup. foot	$ 24
No. 3 Base strips and posts, cubic foot	1 90
Inferior No. 3 posts and strips "	1 65
" No 3 bottom bases "	1 65
" No blue posts, strips and bottom bases	2 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4 "	1 00
Footstones, 5 to 8 in., each	30
" sawed heads, each	32
" " sand rub and box	38

SUTHERLAND FALLS MARBLE—

1888	Superficial. 1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Cu. Monumental.
Mourning veins	53	66	87	92	1 28	1 84	5 40
No. 1	48	59	82	87	1 30	1 74	4 90
Average	38	49	62	67	1 03	1 34	3 90
No 2	28	34	42	47	70	94	3 15
Best No. 3	23	29	35	37	55	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Stripe and Posts, per cubic ft.	$1 90
Inferior No. 3, Posts and Stripe, per cubic foot	1 65
Inferior No. 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 12 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 2 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup. ft.	24

ITALIAN MARBLE—

	Cu. ft.
Monumental stock	$4 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size.
¾ in slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubit foot.

MOUNTAIN DARK MARBLE—

1888	Superficial. ¾ in.	1¼ in.	2 in.	3 in.	4 in.	Cu. Monumental.
No. 1	3	74	1 07	1 60	2 14	5 90
Average	45	64	87	1 30	1 71	4 90
No 2	32	49	67	1 00	1 31	3 90
No. 3	25	34	52	78	1 04	2 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No 3, Stripe and Posts, per cu. ft.	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

SPECIALS—

Diminished Dies, extra......per cubic foot	50c
Stripe ordered 7 ft. long and over, extra per cubic foot	50
Sawing edges slabs, 1 inch thick per superficial ft.	03
" " " 2 " " " "	05
" " " 3 " " " "	08
" " " 4 " " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock......per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths......per surface foot rubbed	05

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " " small lots,		12
Sponges	per lb.	75
Red Grit	"	05
Nova Scotia Blue Grit	"	06
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

TOOLS—

¼ in. Mallet or Hammer Heads	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	33
Frosting Tools	per doz.	3 00
⅜ in. Granite Lettering Tools	"	2 50
½ " " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mesh "	" 2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	2 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb.	each,	$ 60
3 to 5 lb.	"	75
5 to 7 lb.	"	1 25
8 lb. and up	"	1 50

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 3 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 34,000 pounds or more in one order.

Branches of Vermont Marble Co. see price list.

Toledo	40c.
Cleveland	35
Boston	50
Philadelphia	45
Detroit	40
Chicago	50
St. Louis	60

(Lord & Griswold, Chicago.)

	Cu. ft.
Tennessee Red	$2 50@$5 00 f. o. b. Chicago
" Knoxville	3 00 " "
Vermont White	3 50@ 8 00 " "
Ophite	4 50@ 5 00 " "
Armodite	1 50 " "

GEORGIA MARBLE—

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$6 50	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 60
Cherokee average	2 75	3 10
No. 3 base Stripe and Posts	1 50	1 95
Inferior No 3 Posts and stripe	1 25	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	65
Markers, 16 to 18 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	25	35
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	50
Stripe ordered, 9 feet long or over, extra	50	50

Urn list, sent on application.

(Columbian Marble Company.)

SAWED MARBLE—

Columbian Dark.

	per cu ft.
Extra dark variegated	$5 00
No. 1. dark variegated	4 50
No. 1 dark mottled	1 60
No. 2 dark	3 50
Pearl blue	3 50
Inferior dark bases and stripe	1 75

Columbian light.

Light medium Cloud	$4 50
Best light cloud	3 50
No. 2 light cloud	2 60
No. 3 light cloud	2 00
Inferior light	1 25

	Per superficial foot. 1 in.	1¼ in.	1½ in.
Extra dark variegated	50	62	80
No. 1 dark variegated	40	55	75
No 1 dark mottled	40	55	75
Pearl blue	35	45	56
Light medium cloud	40	55	75
Best light cloud	35	45	56
No. 2 light	25	30	35
No. 3 light	18	23	25
Hearth, sawed edges	20	—	—

Sawed marble.

	each.
Footstones, 5 to 8 inches	$ .20
Footstones, 5 to 8 inches, sawed heads	.22
Footstones, 5 to 8 inches, sawed heads, sanded and boxed	.28
Footstones, 5 to 8 inches, oval heads	.28
	per cu ft.
Diminished dies, extra	$ .50
Stripe and posts, 7 feet and over, extra	.50
Sand rubbing	.35
Boxing	.25

All monumental stock will be boxed, with the exception of base stripe and posts, unless otherwise ordered.

Bedding marble, tile and curbing. Prices given on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

	cu ft.
Extra dark veined	$1 50
Dark blue	3 50

MACHINERY.

STEAM PUMPS—

	Discount
Smedley's	25 per ct.

PULVERIZERS—

	Discount
Cyclone	20 per ct.

HOISTING ENGINES—

(Vulcan Iron Works, Toledo, O.)

Complete	$100

EXCAVATORS—

Little Giant	$1,500
Railroad Giant	6,500

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting. Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 16 in.	$20 00
No. 2	" 20	25.00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$50.00
" 0	" " " " with "	54.00
" 1	" 21x27, " 10 with hood	40.00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 5,	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Steel "Hercules"	42½ per ct.
Steel	42½ "
Gal. Iron	35 "
Iron	35 "
Wire Rope Blocks	25 "

(Washburn & Moen M'f'g. Co.)

Iron	35
Steel	42½
Gal. Iron	35

BLOCKS AND TACKLE—

(Boston & Lockport Block Co., Boston.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron-bushed	2 40	4 50	6 20
10 " "	3 30	5 80	8 60
12 " "	4 50	8 00	11 80
14 " "	6 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	29 00	46 00
20 " "	21 00	37 00	46 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 25	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00
Steel Tackle Blocks	Single	Double	Triple
6 inch	1 25	2 25	3 40
8 "	1 90	3 20	5 00
12 "	4 00	7 00	9 00
14 "	5 00	8 50	12 00

Iron-bushed, discount 20 per cent.; self-adjusting roller-bushed discount 20 per cent.

WROUGHT-IRON PIPE—

(American Tube & Iron Co.)

	Discount
Butt weld. black	55 per ct.
" " galv.	45 "
Lap " black	65 "
" " galv	65 "

BELTING-RUBBER.—

Standard	60 per ct. and 10 per ct.
X quality	60 " " 10 "

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	32 00

RED SANDSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	60c
Dunreith, red	60c
" variegated	35c
Burlington	40
McArthur	65
Carlisle	65
Potomac	50

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft.
No. 1 Promiscuous block	50c
No 2 " "	40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	40c
No. 2 " "	30
No. 1 Monument Bases, broken to size	45
No. 2 " " " "	35
Pier Blocks " "	20

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 6 " "	09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	25c
6 " " "	46
9 " " "	68
12 " " "	88
3 in. Berea or Blue Amherst	21
6 " " "	41
12 " " "	77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	10
2½ " "	12
3 " "	14
4 " "	16

SPLIT PLATFORMS— Superficial feet.

	5in.	12 in.
No 1 Buff Amherst	25c	60c
No 2 " "	20c	50
No. 1 Berea or Blue Amherst	20c	50
No 2 " " "	17c	40
No. 3 " " " (for sidewalks)	12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE— Cu. ft

Promiscuous Blocks	15c

Write for discounts, e c.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST— Cu. ft.

No. 1	30c
No. 2	25

(French Fort Quarry, New Castle, N. B)

Olive	40c f. o b.

(Babbitt Sandstone Co., Ypsilanti, Mich)

Brown Sandstone	25 f. o. b. quarry

(Lake Huron Stone Co., Detroit, Mich)

Blue Sandstone	20c f. o. b

SLATE.

[Henry Folmer, Easton, Pa]

F. O. B. Slatington, Pa.

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 18 cents square foot in car lots.

ROOFING SLATE—

Size.	No. in sq.		Size.	No. in sq.	
14x24	98	$3 50	10x18	192	$3 76
13x24	106		9x18	214	
12x24	115		10x16	222	
12x22	127		9x16	247	
11x22	138		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

[Coolman & Westcott Fairhaven Vt.,]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17

For rubbing both faces of above, excepting caps and fruases extra	.02
Any of the above unrubbed less	.01
Steps, to 5 ft. in length	.20
Steps 5 ft to 8 ft, "	.26
Steps larger	special
Platforms to 16 sup. ft	.20
" 16 to 22 " "	.25
" 22 to 28 " "	.30
" Larger	special

Prices for steps and platforms includes one face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	.22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	.22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscoting, sup ft	.20
Black Boards, ⅜ to ½ up to 3 ft. wide, crated sup. ft	.18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft	.20
Black Boards, 3½ ft. to 4 ft. wide crated, " "	.22
Thresholds to 5 ft in length " "	.20
" 5 ft. to 8 ft. " " "	.25
Curriers' Slabs, faced one side crated, " "	.30
Curriers' Slabs, faced two sides, crated, " "	.34
Billiard Table Beds, crated, " "	.22
Imposing Stones, " "	.30
Grave Covers, sawn and planed only, and in two or more pieces. " "	.16
Grave Boxes, rabbeted ends, " "	.20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	.16
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	.20
16 to 22 " "	.25
22 to 28 " "	.30

Vermont Red	$13 50	f. o. b Chicago.
" Purple	5 50	" "
" Green	5 50	" "

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x16, 15x20	2 65	"
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 75	" "
Maine	5 50@5 50	" "

BLACK—

(Michigan Slate Co., Lansing.)

Michigan	$5 50 f. o. b. quarry

PURPLE ROOFING SLATE —

(Hazard Slate Company Fair Haven, Vt)

	First.	Second
24x12	$3 75	$2
22x14	3 75	2
22x12	3 50	2 5
22x11	3 85	2 25
20x12	3 85	2 25
20x10	3 85	2 25
18x12	3 50	2 35
18x10	3 50	2 25
18x 9	3 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	3 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	2 75	2 25
14x 9	2 75	2 22
14x 8	2 75	2 25
12x10	2 50	2 25
12x 9	2 50	2 25
12x 8	2 50	2 25

TOOLS.

SHOVELS—

(Sandford, Fork & Tool Co., Terre Haute, Ind.)

20 per cent. discount 2 per cent. cash.

REAMERS—

(Knox Rock Blasting Co., Pittsburgh, Pa.)

	each
3 feet long	$3 00
6 "	5 00
9 "	6 50
12 "	8 00

TOOL STEEL—

(F. C. Brooksbank, Cleveland, O)

Jackson's	16c per lb.

[J. H. Knippenberg, Cleveland, O]

Stone Cutters Mallets	$12 00 Doz.

Wooden Rolls for stones 3 feet long	4	5	6	7	8 in.
	20c	35c	50c	60c	75c each

STONEWORK AMONG THE ANCIENTS.

Persons who inspect the obelisk in Central Park for the first time frequently express astonishment that so large a block of stone could have been successfully quarried, carved and handled by the ancients, especially as such work is done with difficulty, even with the improved machinery of the present age. In talking the other day with one of the leading granite men of the country, who has made a personal inspection of the pyramids of Egypt, he said: "There are blocks of stone in the pyramids which weigh three or four times as much as the obelisk. I saw a stone whose estimated weight was 880 tons. The builders of the pyramids counted human labor lightly. They had great masses of subjects upon whom to draw, and most of their work was done by sheer manual labor and force. There are stones in the pyramids 30 feet in length, which fit so closely together that you may run a penknife over the surface without discovering the break between them. They are not laid with mortar either. There is no machinery so perfect that it will make two surfaces 30 feet in length which will meet together in unison as those stones in the pyramids meet. They were undoubtedly rubbed back and forth upon each other, until the surfaces were assimilated to each other."

The large stones at the base of the Gate City National Bank building are smooth and soft, and make excellent whetstones. This fact has become known to a great many citizens and small boys, and it is no uncommon sight to see a half dozen persons standing near the building sharpening their knives. Whenever two men stop at the bank corner to hold a conversation, out come their knives, and the sharpening goes on as long as the talk lasts. —*Atlanta Journal.*

What is that word of five letters, of which, you take away two, only one remains?

Stone.

A granite cutting machine, invented in New Brunswick, and just purchase by Camden parties, is attracting much attention among the stone workers of eastern Maine. The new owners are experimenting with it to see if it can be made to work satisfactorily. The machine has cutters one above the other, which are fixed to loose pulleys on a movable shaft. They are one inch thick, going to an edge. The cutters move up and down, and the stone is brought to them on a carriage, similar to that of an iron planer. If the machine cuts stone as rapidly and well as claimed, it will revolutionize the granite business; but this is far from being an assured thing.—*Bangor, Me., Commercial.*

A New Haven professor, who has spent his vacation among the granite quarries of Vermont and New Hampshire, found a curious piece of stone which resembles one of the small idols worshipped by the Hindoos and Chinese. The figure has a sitting posture, and has all the form and details of a human being in correct proportions.

SPECIAL NOTICES.

"For Sale" ads. will be inserted at the low rate of one cent a word, each time. Terms, cash with order.

Dealers wanting workmen, or workmen wanting situations, are requested to avail themselves of our columns to make their wants known. There will be no charge made for the service.

Write to our advertisers for their illustrated circulars, descriptive pamphlets, etc. There's a fund of information in all such printed matter, for tradesmen. And don't forget to mention in your letter that it was STONE that induced you to write.

BOSTON & LOCKPORT BLOCK CO.,
(Successors to Bagnall & Loud Block Co., Penfield Block Co.)
FACTORIES:
Boston, Mass. Lockport, N. Y.

Both Patent Differential Hoist.

This improved Hoist is the most Compact Hoist for setting monuments in the market. One man can always handle it alone.

It is both simple and low priced.

Also manufacturer of

The Best Wire-Rope Block in the Market,
—AND—
LOUD'S DIAPHRAGM HAND POWER PUMP
And Self-Adjusting Roller-Bushed Blocks.
Send for Illustrated Catalogue.

ROMONA OOLITIC STONE CO.,
Romona, Ind.
Office: 15 Ingalls Block, Indianapolis, Ind.
OOLITIC (BEDFORD) BUILDING AND BRIDGE STONE,
"BUFF" and "BLUE."

HYDEVILLE MARBLEIZED SLATE MANTEL COMPANY,
—Manufacturers of—
ARTISTIC SLATE MANTELS,
Furniture Tops, Art Vestibule Work, Bracket Shelves, Wash Sinks, Bath Tubs, Urinals, Grave Boxes, Lamp Bases, Turned Columns.
GRAINED MANTELS, IN IMITATION OF WOOD, A SPECIALTY.
Hydeville, Vt.

JAMES COULMAN H. H. WESTCOTT
COULMAN & WESTCOTT,
Quarrymen and Manufacturers of
Marbleized Slate Mantles,
AND EVERY DESCRIPTION OF SLATE GOODS.
FAIR HAVEN, VT.

GOVERNMENT PROAPOSLS.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 11th day of December, 1888, for the labor and materials required in the erection and completion of the Extension of the U. S. Court House and Post Office, building at CHARLESTON, W. VA., in accordance with the specification and drawings, copies of which may be seen at this Office, the office of the Superintendent, the Builders' Exchanges in Baltimore, Md., Cincinnati, O., and Pittsburgh, Pa., Builders' and Traders Exchanges Chicago, Ills. and Louisville, Ky., and at the Mechanics Institute, Richmond, Va.

Each bid must be accompanied by a certified check for $500.

Upon receipt at this office of a P. O. money order in amount $3.00, drawn to the order of the Treasurer of the United States, parties will be furnished with copies of the plans and specification to a limited number.
WILL A. FRERET,
Nov 14 1888. Supervising Architect,

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 15th day of December, 1888, for labor and materials required in the erection and completion of the approaches to the U. S. Court House, Post Office &c., at MARQUETTE, MICHIGAN, in accordance with the specification and drawing, copies of which may be seen at this office, the office of the Superintendent, the Builders' and Traders' Exchanges at Chicago, Ills., and Milwaukee, Wis., the Builders' Exchanges at Detroit, Mich., Minneapolis, Minn., Indianapolis, Ind., and Cincinnati, O., and the Office of the Builders' and Dealers' Exchange Co., Cleveland, O.

Each bid must be accompanied by a certified check for $100.

Also a limited number of plans and specifications are for sale at this office. Price $1.00 each, in P. O. money-order, drawn to the order of the Treasurer of the United States.
WILL A. FRERET,
Nov 22, 1888. Supervising Architect.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington D. C., until 2 o'clock P. M. on the 11th day of December, 1888, for the labor and materials required in the completion of the approaches for the Post Office, &c., building at LEXINGTON, KY., in accordance with the specification and drawings, copies of which may be seen at this office, the office of the Superintendent, the Builders' and Traders' Exchanges at Louisville, Ky., and Chicago, Ills. The Builders' Exchanges at Detroit, Mich., Cincinnati, O., and Indianapolis, Ind., and the Builders' and Dealers Exchange Co., Cleveland, O.

Each bid must be accompanied by a certified check for $300.

Upon receipt at this office of a post-office money-order, in amount one dollar, drawn to the order of Treasurer of the United States, parties will be furnished with copies of the specification and plan, to a limited number.
WILL A. FRERET,
Nov 22, 1888. Supervising Architect.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C. until 2 o'clock P. M., on the 11th day of December, 1888, for the labor and materials required in the completion of the interior finish of the U. S. Court House and Post Office, building at FORT SCOTT, KANSAS, including plumbing, gas fitting, &c., in accordance with the specification and drawings, copies of which may be seen at this office, the office of the Superintendent, the Builders' Exchanges at Wichita, Kans., Detroit, Mich., Cincinnati, O., and Indianapolis, Ind., the Builders' and Traders' Exchanges at Chicago, Ills., Louisville, Ky., and Kansas City, Mo.

Each bid must be accompanied by a certified check for $500.

The Supervising Architect will furnish a limited number of the specification and drawings at five dollars a set, upon receipt of that sum in post-office money-order, drawn to the order of the Treasurer of the United States.
WILL. A. FRERET.
November 13, 1888. Supervising Architect

THE INDIANA
Soldiers' Monument.

Early during the present month advertisement will be made asking for bids for the erection of the superstructure, or main shaft and appendices, of the State Soldiers' and Sailors' Monument, upon foundations already erected. The work will require 100,000 cubic feet, more or less, of oolitic limestone from the quarries of this State, in blocks averaging about five tons in weight, a few being as heavy as fifteen tons. It is expected that the structure will be completed during the next building season.

This preliminary notice is given to enable those who wish to enter the competition for the contract to inform themselves as to quality and cost of stone, and to be otherwise so prepared that their proposals will be well matured and made promptly when called for.

Prospective competitors who notify the Secretary in time of their intention to bid will be furnished a full set of plans and specifications, which may be kept, and returned on the day that the proposals are opened. This is done for the especial accommodation of those living at a distance who may wish to enter the competition.

W. H. ANDERSON & SON,
—Manufacturers and Dealers of—
Stone, Marble and Granite Workers' **TOOLS.**
Sledges, Hammers, Bars and Quarry Tools.
Telephone 1911. 38 Clinton-st., DETROIT, MICH.

Champion Quarries!
J. A. GREEN, Proprietor,
Our Stone can be quarried at any season of the year. Frost or heat does not affect it. It grows harder and better the longer it is exposed to the atmosphere.
GOOD LIME, CEMENT, ETC., ALWAYS ON HAND. Write for Prices.
STONE CITY, IOWA.

LINCOLN IRON WORKS,
Rutland, Vt.
— Manufacturers of —
Stone-Sawing Machinery,
HOISTING MACHINES,
Planers, Jointers, Rubbing Beds, Derricks,
Etc., Etc.
Send for Catalogue No. 2, just issued.

BARRE GRANITE. **H. M. PHELPS & CO.** BARRE GRANITE.
Our Quarries Produce the DARKEST and MOST BEAUTIFUL GRANITE in Barre.
We keep the largest assortment of FINISHED GRANITE MONUMENTS of any concern in the state, and more than all the firms in Barre combined.
Send for sketches of finished work. Your trade solicited.
Quarries, Barre, Vt.
Mill and Works, Burlington, Vt.
Office: 190 Bank Street, BURLINGTON, VT.

GILSON & WOODFIN, QUARRIES, MILL AND OFFICE, WEST RUTLAND, VT.
Rutland Marble,
Rough or Finished.
BRANCHES.
Our representatives in the different cities are:
Boston Marble Co., 8 Thacher-st.
Philadelphia Marble Co., 201 South 30th-st.
Cleveland Marble Co., 179 Merwin-st.
Toledo Marble Co., 10 Lafayette-st.
Detroit Marble Co., 278 Woodbridge-st., West.
Chicago Marble Co., East End Michigan-st.
St. Louis Marble Co., Corner 11th and Spruce-sts.

VERMONT MARBLE COMPANY,
Rutland, Sutherland Falls and Mountain Dark Marble.
BRANCHES:
Boston Marble Co., 8 Thacher-st.
Philadelphia " 201 South 30th-st.
Cleveland " 179 Merwin-st.
Toledo " 10 Lafayette-st.
Detroit " Woodbridge-st., bet. 5th & 6th.
Chicago " East End of Michigan-st.
St. Louis " Cor. 11 and Spruce-sts.
San Francisco Branch, 244 Brannan-st.
Main Office:
PROCTOR, VT.
QUARRIES, MILLS AND SHOPS AT
PROCTOR,
CENTER RUTLAND,
and WEST RUTLAND, VT
The Largest Producers of Marble in the World!

4.000 GALLONS OF Water can be raised per hour by hand.
HAND
with LOUD'S patent Frictionless Diaphragm PUMP
POWER
CHEAPEST AND best Pump for water containing SAND, MUD, Sewerage &c.
PUMP.
Send for Descriptive Circulars.
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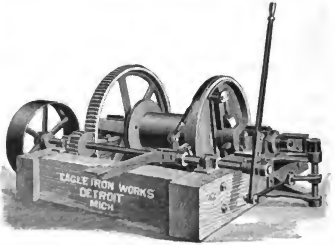
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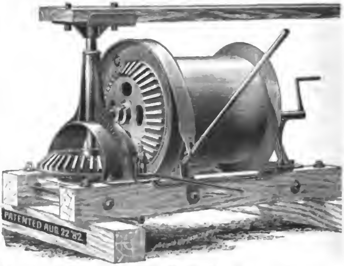
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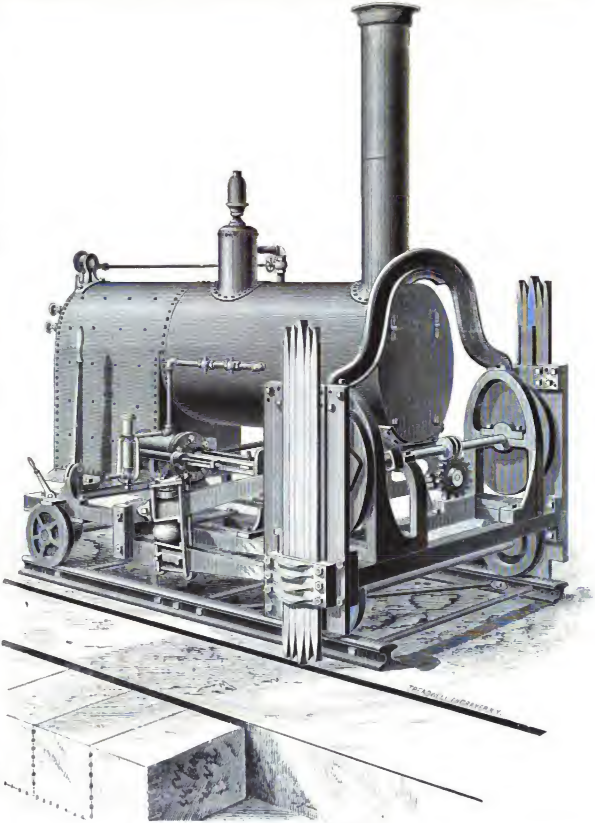
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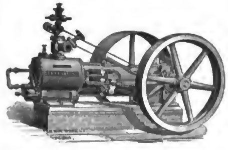

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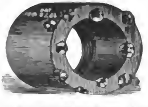

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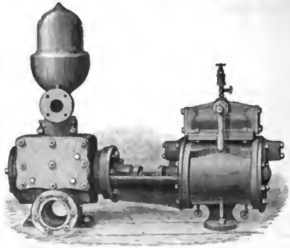

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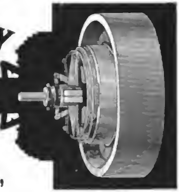

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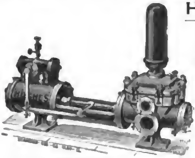

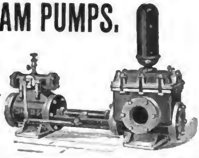

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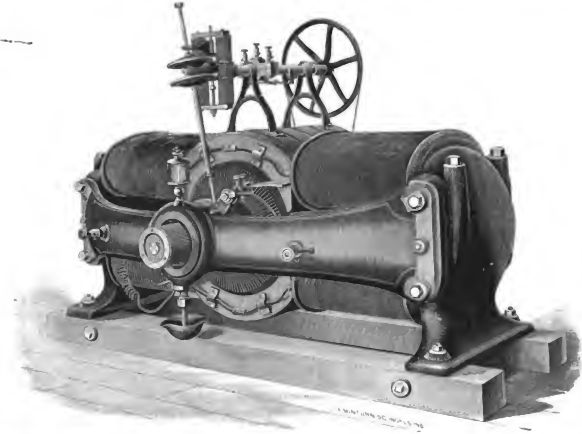

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STONE

VOL. I. INDIANAPOLIS, IND., JANUARY, 1889. NO. IX

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

PUBLISHED MONTHLY BY

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Readers of "STONE" who desire to purchase machinery, or wish information concerning any class of machinery, not advertised in our pages, are invited to send particulars, and we will put them in the way of satisfying their wants without charge for the service.

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THE best building practice suggests the use of piers with thin walls between rather than continously heavy walls.

A STONE coon has been deposited in the front vestibule of Gen. Harrison's residence by an enthusiastic friend.

IT is said that perhaps three-quarters of New England is composed of metamorphic rock. Serpentines occupy the least of the area of that section.

THE carving of the tower building of New York in all cases extends beyond the faces of piers, walls and pilasters. In no instance is there any part of the supporting structure weakened by cutting.

WHILE it is true that so large a proportion of New England is composed of good building stone, it is noticeable that it is only during a comparatively recent period that it has been extensively used.

WE will club STONE with the *Granite Cutters' Journal*, official organ of the Granite Cutters' National Union, for $2 a year. Every practical granite cutter will improve in his work by reading STONE. Subscriptions sent to either office will be properly listed under this arrangement.

WE have in hand the bi-ennial report of the state geologist and curator of cabinet of the state of Vermont, Mr. Geo. W. Perry. He speaks in general terms of the state of his work and the quality of the stone products and mineral industries of that state. The slate business of twelve concerns represented a value of $797,446. The output of granite is valued at $461,900. Marble at $1,524,000. The total output of the above is valued at $2,783,366. It is said that this is ten times as great as the business in the same line ten years ago. Mention is made of the small business in copper, iron and aluminum. There are also small deposits of soapstone in the state.

THE competition for our prize designs for the best Tablet will remain open a few months longer. We are disappointed at the lack of interest thus far shown by draughtsmen in this contest. We have received several designs, but not enough to make the competition valuable. A premium of $40 in cash, for first, and $10 for second prizes, besides the distinction which the selection would confer, upon the winners of the chief prizes, should be sufficient to draw out a large number of designs from the best draughtsmen in the country. We regret to say it has not done so, though we have heard of a dozen instances where persons have expressed an inclination to compete, but were afraid they could not win, and therefore backed out. That's cowardly. Young men with such notions will never reach the top. Courage in brainwork, is just as essential to success as courage in battle. We hope by extending the time to receive a large number of responses, See advertisement.

[Written for Stone.]

THE SERPENTINES AND VERDANTIQUE MARBLES.

BY GEORGE P. MERRILL

THE rock serpentine consists essentially of nearly equal parts of silica and magnesia combined with from 12 to 14 per cent. of water. As quarried the rock is never in a state of absolute purity, but carries sometimes as high as 10 per cent. of iron oxides, together with chrome oxide, calcite, dolomite, and sundry minerals of the amphibole, talc or mica group. The reason for this diversity in composition lies mainly in the fact that serpentine never occurs as an original deposit, but is always secondary, a product of alteration from other rocks such as beds of dolomite, hornblende, pyroxene, or of basic eruptive rocks, such as the peridatites. As these rocks in no case consist of pure magnesian silicate, but carry in addition lime, alumina, and iron oxides these constituents as a rule separate out during the process of change and recrystallize in veins, streaks and blotches as calcite, dolomite magnetite, etc., thus producing the common variations in color. The purer varieties are uniformly green or light yellowish, while the commercial forms, as is well known, are variously streaked and blotched and sometimes brownish, almost black or even of a blood red color, the various shades, according to Delesse being dependent upon the amount and state of oxidation of the included ferriginous substances.

The name serpentine, by the way, as applied to this class of rocks is from the Latin *serpentinus*, a serpent, in allusion to the colors and their spotted and mottled arrangement. The name *ophio'ite*, or ophite, as sometimes applied to the spotted green and white varieties, is from the Greek word *opitns* also meaning serpent or serpentlike. The name *verdantique* (verte antique or verde antiquo) antique green, it should be stated, is not applied to the rock of any particular locality, but to any of the green serpentinous marbles used by the ancient Romans and which were obtained originally from Italy, Greece or Egypt.

No stone with which the quarrymen and marble-workers have to deal is, as a rule, so full of defects as these serpentinous rocks. It is in most cases practically impossible to obtain slabs of more than a few feet in diameter which will not through flaws or dry seams fall apart if sawn at all thin, and it can in no case be used in blocks or pillars of any size where more than a very moderate degree of strength is required, since the prevalence of these seams so weakens it as to render it valueless. Every line or vein of different color with which the stone is traversed but marks an old flaw and is a line of weakness.

A total disregard, due presumably to ignorance, regarding this trait of serpentinous rocks has led to no end of quarry failures. No longer ago than the summer of 1887, the writer was at Deer Isle, on the Maine coast, and found there the abandoned quarry, sheds and costly machinery of a company, who without apparently sufficient knowledge of the character of the material, but judging it wholly by small selected samples, had invested their capital with the intention of putting the stone on the market not merely in the form of slabs for table tops, wainscoatings, etc., but also for pillars, columns and pilasters. The characteristic trait, however, soon made itself apparent, and all too late it was discovered that a finely sawn and polished column would, on seasoning, so develop flaws as to fracture with trifling shocks even if it did not fall asunder by its own weight.

This almost universal characteristic of the stone is one investors will do well to bear in mind. Still another fact worthy of being remembered is that however high a lustre the stone may take, or however beautiful it may be in small pieces the color is not one that readily accords with its surroundings, and the demand for it for purely decorative work must always be more limited than that for other marbles whose colors are more harmonious. Moreover, the stone is not well suited for polished work in exposed situations since the different substances composing the body of the stone and filling the veins and imparting beauty by contrast, will on exposure weather unequally, some portions losing their polish and crumbling away while the whole stone shortly becomes unsightly. This property of veined rocks was mentioned in my last paper on the selection of building stone. In our trying climate the stone in its polished state should never be used out of doors. I know of no better illustration of poor judgment than such as I have often observed in the case of verdantique marbles for exterior paneling, the bases of monuments or even for tombstones. The white and yellowish veins lose their lustre and crumble away, or turn dull yellow, the whole block becomes seamed and the serpentine itself takes on a greasy lustre making it as unsightly as it once was beautiful. For small ornaments, and in slabs of moderate size for interior decoration it is capable of good effects. Too much has been, and still is expected from it, and in this largely lies the failure that has fallen to the lot of nearly every quarry that has been opened in America.

We will now briefly notice the serpentines and verdantiques found within the limits of the United States and also the more important of those imported.

The verdantique now most generally used in this country and which is seen so frequently in soda fountains is from Pietra Laveza, near Genoa, Italy. The stone while in process of formation was shattered into millions of fragments and then slowly cemented by the infiltration of calcite, the result being as we all know, a bright green, sometimes reddish or brownish lustrous rock traversed in every direction by wavy and angular lines of snowy white. Its value at Genoa is about two dollars a cubic foot. Another Italian verdantique found in our markets is the *Verde di Prats* from the Appenines, a few miles from Florence. This is a deep green rock containing nodules of diallage and traversed like that of Genoa by white or yellow veins which are, however, according to Delesse, of steatite rather than calcite. The fragmental character of this rock is less pronounced than that of Genoa and it acquires a less brilliant polish, but works more readily, being softer. It is stated by Hull to decay rapidly on exposure to the atmosphere. This authority states that the walls of the cathedral of Florence, of the campanile commenced by Giotto in 1334, and of the church of Saint Maria Novella were built of alternating courses of the serpentine of Prats, white marble from Carrara and a reddish sandstone. The effect of this combination was one of the "most richly decorated exterior walls of any church in existence."

Owing, however, to the decay of the serpentinous blocks it has been found necessary to replace them in part by fresh material. A dark green, almost black, variety of serpentine from this same locality is stated by Delesse to be the celebrated *Nero Antico* used in ancient Rome. Still other Italian verdantiques, though less known in our markets are the verde or rosso-di Levanto, and the verde di Pegli.

One of the most beautiful serpentinous rocks known occurs in the Lizard District, Cornwall, England. The rock is pronounced by Bonney to be an altered peridotite and though fully sustaining the reputation of its class for being seamy is of sufficient value to have come into very general use in the English markets. A variety of colors prevail. The main mass is stated by Hull to be deep olive green, and this is the color commonly seen in the turned columns serving for supports to small statues and busts in the homes and art galleries of the United States. The national collections at Washington show several varieties of the stone, the most striking of which has a deep greenish or brownish base traversed by an irregular network of blood red lines. The stone is worked by J. Druit & Co., of Ruan Minor, Cornwall, and is much used for ornamental fonts, pulpits, small shafts, pilasters, as well as for vases and slabs for inlaid work. It is claimed that blocks from seven to eight feet in length and two to three feet in diameter are obtainable. The stone is soft, admits of a high polish and is durable when protected from the weather. It is strange that the stone is still practically unknown in the markets of the United States.

The serpentine commonly known as Irish or Connemara green, is, according to G. H. Kinahan, brought from the west coast of the county of Galway, Ireland, though similar beds are known in Donegal and Waterford counties. Like all serpentines this varies in color in different localities, some being dark green uniformly clouded while others are leek green, the majority being mottled, spotted and variously shaded or veined with white. Hull states that small tablets of this stone exposed in the outer walls of the museum of Trinity College, Dublin, became tarnished within the space of ten years, while columns of the same adoruing the hall and protected from the weather still retain their polish.

But the United States are by no means lacking in verdantique marbles of equal beauty with those described. I have gone so much into detail since at present these Italian, English and Irish stones practically control our market, such as it is.

I have already spoken of the serpentine on Deer Isle, Maine. This however has little to recommend it, being too dark and dull in color to ever be in great demand. Beds of serpentine are particularly abundant in Vermont, and many of them are capable of furnishing material of extraordinary beauty. Some of the prominent localities are New Fane, Windham, Chester, Ludlow, Cavendish, Proctorsville, Plymouth, Warren, Roxbury, Northfield, Rochester, Lowell, Westfield and Troy. As long ago as 1861 Prof. Adams reported on the Lowell stone as occurring in inexhaustible quantities, and being of insurpassable beauty. Concerning the Troy stone he said "Elegant varieties are numerous, among which are most conspicuous the very bright green noble serpentine, which covers most of the numerous jointed faces with a coat of $\frac{1}{8}$ to $\frac{1}{2}$ of an inch thick, and the spotted varieties. Numerous seams may render it difficult to obtain large slabs, but smaller pieces suitable for a great variety of ornamental purposes may be obtained of great beauty and in any quantity."

So far as I am aware the bed at Roxbury is the only one of these that has been systematically worked. Somewhere about thirty years ago the American Antique Marble Co. began operations here but their works have long since been discontinued for reasons unknown to the author. A quantity of the stone was sent to Washington for decorating the interior of the Capitol but it was never utilized. It is possible that this may have been in part due to the ignorance of workmen and inability to finish to a smooth surface for polishing. The vein materials being harder than the ground mass of serpentine stand out in relief and the ordinary methods of polishing are not always productive of the highest lustres, but give a greasy aspect. When properly finished it is, however, one of the most beautiful of all our serpentinous rocks. It consists of large masses or fragments of deep dark green serpentine bound together by a white cementing material so that a polished surface shows a deep green lustrous ground traversed by fine and coarse angular lines of white and greenish. The stone as shown by blocks in the National Museum at Washington is certainly as beautiful as any of the foreign varieties, and it is safe to say that were the quarry in Italy or France it would be actively worked and the product exported to the United States.

A chemical investigation of the Roxbury stone, as given in the Vermont Geological Report, showed the green portion to consist of: silica, 42.6 per cent.; magnesia, 35.50 per cent.; oxides of iron and chromium, 8.30 per cent.; carbonate of lime, 0.60 per cent., and water, 13.00 per cent. An analysis of the white vein material yielded: carbonate of magnesia, 80 per cent.; carbonate of lime, 15 per cent.; carbonate of iron, 3.50 per cent., and silica, 1.50 per cent. The stone is, therefore, as designated by Dr. Hunt, a mixture of serpentine, talc, and a ferriferous carbonate of magnesia. I am thus particular in noting the composition of this vein matter, since in many of the foreign stones of this class the cement is calcite, or carbonate of lime. Now, under ordinary circumstances calcite is more readily soluble, and hence will weather more rapidly than carbonate of magnesia; hence it follows that if the tenacity be the same, the Vermont stone will be the most durable in exposed situations.

Beds of serpentine rock also occur in Massachusetts, particularly at Lynnfield and Newburyport, in the eastern part of the state, and near the west end of the Hoosac tunnel, in the western part. The stone at the two first named localities is dull green or light yellowish mottled, and so far as the author has observed not of remarkable beauty. A quarry was at one time worked at Lynnfield, but, according to Prof. Shaler, the company was wrecked by bad management, and nothing has now been done for many years. The Hoosac tunnel stone although very promising in small pieces, has never been utilized. A deposit somewhat resembling that of Lynnfield occurs near Milford, Connecticut, and somewhere about 1811-15 was wrought with considerable activity, furnishing quite a quantity of very rich marble. The experiment proved a failure, though, according to Prof. Shepard, not through any defect in the stone, but through the "then want of wealth and taste in the country to sustain the enterprise." Be this as it may, the same deplorable condition of affairs would seem to still exist, since this deposit is even now unworked, though a systematic attempt to form a company and "boom" the property was made about 1850, only to meet with an equally dismal failure. The name, Verdantique, as applied to this stone is, however, a misnomer, since it is really a serpentinous limestone, and varies from blue-gray to yellow, with only occasional masses of sufficient depth of green to be comparable with the true verdantique.

A serpentinous rock of the variety *ophicalcite* or *ophiolite*, occurs in large quantities near Port Henry and Moriah, Essex county, and near Thurman, in Warren county, New York State. This stone, which is an altered dolomitic and pyroxenic limestone, seems nearly free from the numerous dry seams and joints that prove so injurious to most of the serpentines, and can be obtained in sound blocks of fair size. Several quarries have been opened in the Essex county, and at least one in the Warren county area, but for one reason and another all have been abandoned except one now operated near Moriah, by Mr. J. S. Reed. The stone consists of serpentine and calcite in about equal parts, with small admixtures of white mica, graphite, a mineral of the pyroxene group, and, in places, pyrite. The pyrite is of course liable to oxidation, and hence its presence is deleterious, and it is said to be the prevalence of this mineral that led to the abandonment of the older quarries. Other reasons, however, doubtless contributed. Among these is the fact that at none of the openings, as seen by myself during the past summer, could blocks of large size and homogeneous texture be obtained, every few feet showing large and irregular nodules of greenish and yellowish serpentine with imbedded scales of graphite, which would prove nearly as objectionable as the dark patches so abundant in many of our granites. Blocks being quarried at the time of my visit showed, however, a very even granular texture of equal parts serpentine and snow-white calcite in grains from one eighth to one-fourth inch in diameter, forming an aggregate quite granitic in appearance at a slight distance. The stone polishes well, and is said to be durable. In the quarry bed, where the stone had been exposed for ages, it was noticed that the calcite had weathered out on the surface, leaving the serpentine protruding in small, greenish knobs. The stone has been quoted in some of the older quarry price lists at $6 a cubic foot for monumental stock.

Last, but by no means least, is to be mentioned the verdantique of Harford county, Maryland. This is one of the most compact, homogeneous and uniformly green of any rock of its class with which the author is acquainted. As seen in the national collection it is deep lustrous green, very compact and free from flaws or the calcareous veins so common in rocks of its class. It acquires a beautiful polish, and being so free from foreign constituents, would doubtless be found to weather more evenly than most verdantiques. Prof. Genth, of the University of Pennsylvania, who visited the locality in 1875, speaks of it as a "variety of massive serpentine, somewhat resembling Williamsite, and occurring in various shades of green from a pale leek green to deep blackish green, and more or less clouded from a small admixture of iron ore," *rarely* with thin veins of dolomite passing through the mass. He states further that it is translucent to transparent, exceedingly tough, and of a hardness considerably greater than that of marble. The analysis of a deep green variety gave the following results:

Silica	40.06	per cent.
Alumina	1 37	"
Chromic oxide	0.20	"
Niccolous "	0.71	"
Ferrous "	3.43	"
Manganous "	0.09	"
Magnesia	39.02	"
Water	12.10	"
Magnetic iron	3.02	"
	100.00	

Specific gravity 2.668, which gives us a weight of 166.75 pounds a cubic foot.

In the same report Prof. Genth gives it as his opinion that in the polished state the stone is practically unalterable, since the polished surfaces do not admit of the absorption of atmospheric agencies, which cause decomposition. "How little effect the atmosphere has upon the stone," he says, "is evident from the examination of rocks on the outcrop, which, although exposed for thousands of years, are not weathered to a greater depth than about $\frac{1}{12}$ or $\frac{1}{8}$ of an inch, and are quite fresh and green below." This quarry lies in Harford county, about 32 miles northeast of Baltimore, and has been operated by the "Green Serpentine Marble Co." It is claimed that blocks 9x4x4 feet have been quarried, and slabs cut and finished measuring 5 feet 4 inches long by 2 feet 3 inches wide.

The subject should not be dismissed without reference to the coarse serpentinous rock of Chester county, Pennsylvania, now and for some years past quite generally used for rough building. The stone is dull, light green in color, soft when first quarried, porous, and though fading slightly and turning whitish in streaks on exposure, seems to be very durable. The rock fully sustains the established reputation for joints and dry seams, and is unobtainable in blocks of large size. The quarrying of dimensions material is an absolute impossibility. The rock is loosened from the quarry bed by blasting, and then trimmed into blocks of small size for rubble work and straight line masonry, in which form it is mostly used. It will not polish, and is never used for ornamental work. The buildings of the University of Pennsylvania, and the Academy of Science, and many other structures in Philadelphia, New York, Baltimore, Washington, and I believe in Chicago are of this material. When properly treated it produces a very pleasing effect, but the color is harsh and care must be exercised in combining it with other materials. The cheapness of the stone is greatly in its favor, and I am told that the Academy of Science building, mentioned above, was constructed at a less cost than could have been a brick structure of the same dimensions. The stone occurs in inexhaustible quantities in Chester county, Pennsylvania, and also at the Bae Hills, but a few miles north of Baltimore, Md.

HITTITE ARCHITECTURE AND STATUES.

On some of the plains of Central Turkey mounds are found. The attention of American antiquarians was called to one of these. Last winter a party of Germans commenced the work of excavation, and 100 laborers in a few weeks' time laid bare a large number of blocks forming, as had been supposed, the basement of a Hittite palace. They were nearly all *in situ*, resting upon rude foundations of masonry. A line of blocks extends along the entire front, then opens midway into an entrance hall, which soon widens into a court about forty feet square. A narrow hall connects this court with another large court further within, which has been uncovered several rods square. The halls and courts are lined by a single row of basalt blocks, each standing on end, and nearly every block contains on its inner surface a Hittite sculpture. At one place is a hunting scene continued along a dozen blocks. The men are armed with daggers, spears and the bow and arrow. Deer, rabbits and birds represent a variety of game. At the entrance to the main court on either side are the bas relief sculptures of an immense lion looking toward the outer door, and behind each lion stands a heavily-armed soldier. The superstructure, resting upon these Hittite blocks, must have been made of sun-dried brick and perhaps in part of wood. The stones bear evidence that the buildings above them were burned. The pile of earth that forms the mound must be the debris of mud roofs and walls from Hittite palaces to the peasant hovels of modern times.

No Hittite hieroglyphics, have yet been discovered, but the most remarkable "find" is the colossal statue of Sardanapalus, King of Nineveh, eighth century, B. C., standing on a pedestal in the smaller court of the palace. The workmanship is very fine. The face speaks like the finest Grecian statues. The statue has been thrown down and broken, but the fragments are all there and the whole figure can easily be restored. On this statue were several square yards of Assyrian inscriptions in cuneiform hieroglyphics, from which the name was determined. But how this statue of an Assyrian king came to be placed in a Hittite palace is not easily accounted for. It is presumed that when Sardanapalus made his expedition through Asia Minor he conquered this Hittite city and erected his own statue in the palace, carefully preserving intact all the productions of the Hittite art. Several shafts have been sunk in different parts of the mound, but thus far no other important results have been reached. The Germans have also discovered in a Turkish cemetery, near Zeujirii, a human statue with nearly a square yard of inscription in what seems to be Phœnician character. Hittite remains have been discovered at different points in Central and Southern Asia Minor, extending as far west as Smyrna and east to the Euphrates.—*U. S. Consular Report.*

CORRESPONDENCE.

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

The National Association of Builders.

To the Editor of Stone.

SIR: I wish to call your attention to the effort we are making to secure a still wider and more complete affiliation of Builders throughout the country in our National Association of Builders.

We already have twenty-four (24) of the largest cities in the country in our organization, but we desire that every city, great and small, should take part with us in the work we are doing.

To that end we have addressed the inclosed circular to prominent Builders in cities not represented, and I would like very much to have you "lend a hand" by giving some notice of our undertaking in your journal, that the idea may be widely circulated.

If you can do so I would be much gratified and obliged.

Yours respectfully, WM. H. SAYWARD, Sec'y.

Boston, Mass., Dec. 10

THE CIRCULAR MENTIONED.

I take the liberty of addressing you, in common with certain other leading Builders of your city, in the interest of the National Association of Builders and the work it is doing on behalf of all Builders throughout the country

I do so with the greater freedom because I am certain that we have at heart the interests of the Builders of your city quite as much as the interests of the National organization; indeed, unless the interests of local Builders in all cities are recognized as our animating purpose, the work of the National Association would be valueless

To come at once to the point, we desire that at our next convention (which takes place in Philadelphia on the second Tuesday of February next, and the two succeeding days) there should be some sort of representation from the Builders of your city.

We would, of course, prefer that the representation should come from a regularly organized Exchange or Association of Builders, but should there be no such society, or should it fail to appoint a representation then we urgently request you and such other Builders as you may succeed in interesting, to appoint representatives to come on to Philadelphia and take part in the convention

Our urgency for some sort of representation from all of the principal cities of the country rests upon three fundamental points, viz.:

1st. There are many important subjects of vital consequence to all Builders of the United States, reforms in which can only be comprehensively secured through the grouping of their interests in a National Association, through which the most thorough consideration may be obtained and concerted action follow in all parts of the country at one and the same time.

2d. A National Association depends for its best strength upon wide-spread and thorough representation from all parts of the country, and from all cities, whether great or small.

3d. The interests of all Builders being affected by the action which may be taken by the central body, all Builders should in some way be represented in its deliberations, and should contribute their counsel as well as share in the expense attendant upon the work.

These three points we think must be easily recognized by all contracting Builders, and we sincerely hope that not only will their potency appeal with sufficient strength to you and others in your city to secure the representation we desire, but that the natural result will be manifested in the establishing or strengthening of an Exchange of builders in your locality—through which the National Association can best hope to disseminate its views and establish its principles.

Some of the important matters which have so far been taken up, and in which the value of that harmony and uniformity of action, so vital to the interests of all Builders, has been completely demonstrated, are as follows:

"The Uniform Contract"—adopted by joint committee of our National Association, and the two National Associations of Architects, and now in process of introduction throughout the country.

"The Apprenticeship System"—formulated on new lines and the first steps taken for its establishment, to be reinforced from year to year under the direction of special committees.

"The Lien Law"—now under consideration.

"Rules and Conditions for Estimating Work"—partially framed and in process of adoption by local bodies.

"Permanent Arbitration with Employees"—partially considered, but still an open question for discussion at the next convention and following ones.

"Uniformity of Measurements"—under consideration

"Uniform Size of Brick"—under consideration.

Also to be brought up at the coming convention:

"Insurance Against Accidents to the Public."

"Establishment of a Department for Giving Sureties for Contractors on Submitted or upon Contracts."

"The Establishment of Trade Schools."

"Profit Sharing," &c., &c.

At the head of this letter you will see a list of the cities so far affiliated with us.

May we hope that yours will be added to the list?

Let me hear from you personally, and pray make a strenuous attempt to be with us in February. Yours faithfully, WM. H. SAYWARD, Secretary.

A Peculiar Product from Nebraska.

To the Editor of Stone.

SIR: I send you by to-day's express a sample of native stone from Nuckolls county, Nebraska. The quarry is on the northwest bank of Elk creek, 1½ miles northeast of Nelson, the county seat of Nuckolls county, Neb. The stone is very easy to quarry as there is not much dirt to strip, and can be worked with little cost, as it can be sawed with a tooth-saw and planed with a jack-plane, and can be easily shipped, as Nelson has two railroads, the Burlington & Missouri, the Chicago, Kansas & Nebraska. The stone has been mostly used in the near neighborhood for cellar walls. I only know of one example of it being cut for trimmings that is the Nuckolls county jail, it is built of red brick and trimmed with Elk Creek stone, and makes a nice contrast. I think it will be quarried and shipped in the near future if the stone proves to be sound, as it is nicely located, besides there are lots of it, some 12 ledges, which range in thickness from one foot to four and a half feet. The gentleman who owns the quarry, Mr. Springer Gallie, is a farmer, and is not much interested in quarrying, but he told me he would lease it and give a good quarryman a good layout. I took it upon myself to send you the sample and description, and would like to hear your opinion of it in the columns of STONE. There are several quarries in Nuckolls county, and I will send more samples and descriptions some other time. Respectfully, M. D. LENNOX.

Hebron, Neb., Dec. 19.

This specimen is a curious one to us. We are not now prepared to say positively what it is. At first glance we should say it was a limestone, and yet there are features about it not common to stone of that character. We shall take another look at it.

Artificial Stone.

To the Editor of Stone.

SIR: Peirce's artificial stone for building and other purposes. A reader of "STONE" desires to know of its merits as a building material.

Respectfully, H. S. P.

Portsmouth, N. H. Dec. 10

We don't know anything about it. We don't believe there is any real merit in artificial stone for permanent building purposes.

The Granite Cutters' Union, New York city, will try to secure action from the next legislature in favor of the abolition of the contract system upon all public works in the city and state. They desire that labor shall be employed directly by the state authorities, without the intervention of contractors.

The new Wellington statue in Hyde Park, London, unveiled recently by the Prince of Wales is said to be the finest thing of the kind in England. It is an effective piece of work, approached by granite steps, on a square, spacious platform of granite and marble mosaic. Boehm was the sculptor.

The Pilgrim Monument at Plymouth, Mass., has at last been completed, and dedication exercises will be held next August. The monument is a statue of Faith, 36 feet high. Its cost, including the canopy over Plymouth Rock, is close to $200,000. The project was originated in 1853.

There is a natural column of sandstone in Daviess county, Ind forty-six feet in height. It is called Jug Rock.

There is usually a good deal of back talk when women get together to discuss the bustle.—*Boston Courier.*

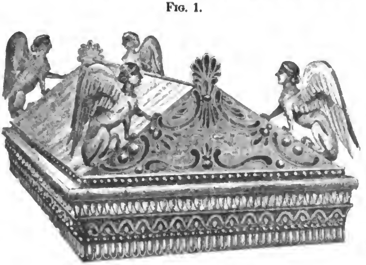
A new marble quarry is to be developed at Clarendon Springs, Vt.

[Contributed.]

ANCIENT MEMORIAL SCULPTURE--III.

WE present in this number additional examples of sarcophagii and styles of ornamentation from the antique. A glance shows in a striking manner the advancement of art from purely archaic or conventional forms to the embodiment of emotions that at once admit fidelity to form and translate the mental conceptions of the artist. For instance, the cover represented in Fig. 1. The lines in the ornamentation are all graceful, and the chimera or sphynx are symmetrical, and drawn with truthful fidelity to form, as such forms were conceived by a purely conventional art, but the features are as totally lacking in expression as the stone out of which they were cut—and as to form they have no relation to any living thing. In strong contrast is the conception represented in Fig. 2, a fac simile from a sarcophagus exhumed from an Etruscan tomb at Clusium. Graceful outlines of glowing life are shown in every line and in every fold of drapery. The features display all the phases of emotion natural to a deathbed scene, without any of that inartistic realism that would have been apparent had a real couch surrounded by a sorrowing family been substituted. All the spirit has been retained in the facial expression and the pose of figure, and the whole depicts not only a series of personal emotions, but a whole theology. A volume could not plainer have conveyed the Etruscan conception of the Hereafter.

FIG. 1.



To the right is a figure as of the angel of death, bearing the inevitable summons. The dying matron, evidently the mother of the family variously grouped to the left, expresses mingled resignation and regret. The husband, with dignified figure and feature, yet plainly grief stricken, endeavors to detain her. To the left is the son and daughter, and probably the wife of the son, while to the extreme left are mythical figures from the unseen world. The conception, however, is so obvious in all the figures as to scarcely require explanation to the most unlearned, because the artist depicted emotions common to human nature in all ages. Besides, in this case there is such a curious coincidence with our present-day conceptions in theology, that but little change would be necessary to make it perfectly appropriate for a modern tomb.

FIG. 2.

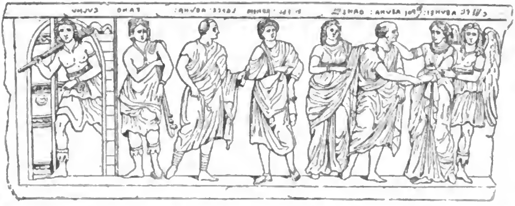


Fig. 3 is of a sarcophagus discovered at Golgoi, Cyprus. Its outline is firm, solid and graceful. Its decorations, while being spirited and dignified, are of lower artistic type than in the preceding, because they depict certain specific heroic acts of life, and do not convey the inner character by reflecting emotions that are the mainspring of all action. It will strike the modern as a curious antique, and may instruct him in the art of mechanical disposition of figure and pose, but it will not inspire emotions of sympathy or admiration, because none are expressed. As a type of ancient art it shows distinctive features of Assyrian origin, with its Assyrian conventionalities mellowed by the greater realism and freedom of an Ionian art, not yet outgrown its archaic stiffness.

It is probable that the cover, Fig. 1, which is also of Cyprian origin, is equally composite, that island being a by-way between Egypt and Asia Minor, and borrowing from all. But we are not so much concerned with these specimens in their historical relation as their intrinsic merit as instructors of constructive art.

Comparisons of the Etruscan specimen with Fig. 3 illustrates an important principle, and that is that sculpture is not a pictorial art in the sense that painting is. The profuseness of detail that may be necessary in a picture is impracticable in a plastic form—in which conceptions will approach perfection as they approach simplicity, execution being equally good.

Applying these illustrations to our modern popular necrological art, they disclose in the latter a great barrenness in ideality and expression in our decoration. Although the types have changed, they are as expressionless as the Assyrian or Egyptian models. This is not true in every case, nor indeed was it always true of these ancient types, but it is true as a whole. We are prone to stiff and conventional forms. Where we are graceful and artistic, it is where we have copied a borrowed model. Where we are ungraceful it is because, unfortunately, we have borrowed the most expressionless of English medievalism, that is so thoroughly impressed upon the public taste as to vitiate all artistic effort by confining it to the atelier of the art devotee, leaving the stone-cutter, who should be an artist—and would be—to grapple with the cold bread-and-butter demand of a dollar-worshiping, unappreciative public. But all this will change, and is changing.

This is a journal for producers, workers and users of stone, marble and granite, and no one has yet had the hardihood to say it isn't a creditable one. Now is the time to subscribe.

THE SUB-ATLANTIC CONTINENT.

WHILE little indeed is known about the previous history of this wonderful globe, enough is understood to make it certain that the land and ocean have changed places perhaps many times. There now exists under the Atlantic ocean the outlines of what must have been a great continent. It has upon it mountains, some of which appear at the surface as islands. The outlines of this submerged continent have been fairly well located by means of deep sea soundings, which have been carried on principally by the United States and England, but it is no doubt true that this elevation of a considerable part of the bottom of the Atlantic ocean is the remains of a far-away continent. It is more than probable that since the beginning of time many continents have been washed away to form new ones, and that our present land surface is the result of many successive wearings away and buildings up of the same material. It is supposed by many that the present continents are the direct result of the tearing down of the material of the sub-Atlantic continent—that it gave up its life for the present land surface.

The most ingenious theory built upon the discovery of this elevation of the Atlantic bottom is by Ignatius Donnelly, who in his book "Atlantis" maintains that on a point on this old, worn-out continent there once existed the beginning of the present races, who spread from this common center over the present world. He maintains that the flood known to us through bible records, and to every other nation through legends in one form or another, is the record of the time when this continent sunk under the waters. While there is no just ground for this supposition, and no way in which it can be in the least substantiated, the book is at least worthy of a reading, in that it contains food for thought and many presentations of geological facts which are interesting.

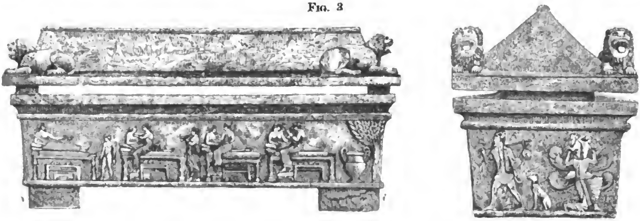
It was long after the earth was created and became a living body, with animal and vegetable life upon it, that the full force of the sun's rays fell upon it. The air was so charged with gases that it could have been only a dim light which penetrated them. The following is from the writing of Prof. Eli Bowen, and is a good description of the state of the atmosphere at the time mentioned :

"During the carboniferous era, although the light of the sun may have prevailed to some extent on the surface of the earth, and had regularly and gradually increased during this period in force over the previous periods, yet it had not thoroughly penetrated or dispelled the zone of vapor which then hung over it. Its light must have been subdued, mellow, and bronze-like. Had it shown with full brilliance and intensity, vegetation could not have attained so prolific a development—its leaves and succulent stems would have prematurely withered and decomposed, and the juices of the forest been evaporated. But the earth was in fact an immense hot-house, surrounded by a zone of carbonic acid, which the feeble rays of the sun in some measure rendered luminous, but which it was necessary to completely dispel before the atmosphere could be made transparent. This was finally accomplished mainly by the prolific vegetation itself, which in absorbing the carbonic acid, and transferring it in fixed carbon to the bottom of the coal lakes, removed the principal obstruction."

PRESERVING PENCIL DRAWINGS.

Pencil drawings may be rendered ineffaceable by a very simple process. Slightly warm a sheet of ordinary drawing paper, then place it carefully on the surface of a solution of white resin in alcohol, leaving it there long enough to become thoroughly moistened. Afterwards dry in a current of warm air. Paper prepared in this way has a very smooth surface. In order to fix the drawing, the paper is simply to be warmed for a few moments. This process may prove useful for the preservation of plans or designs when want of time or any other cause will not allow of draughtsmen reproducing them in ink. A simpler plan than this is to brush over the back of the paper containing the pencil sketch with a weak solution of shellac in alcohol. Chalk and pencil drawings may be fixed (though not so thoroughly as by the above methods) by washing them with skimmed milk, or with water holding in solution a little isinglass or gum. When the first is used great care must be taken to deprive it of the whole of the cream, as the latter substance would cause the drawing to look streaky. An easy way of applying these fluids is to pour them into a shallow vessel, and to lay the drawings flat upon the surface of the liquid; after which it should be gently removed and placed on white blotting paper in an inclined position to drain and dry.—*The Stonemason.*

FIG. 3



The work of laying the iron on the Barre (Vt.) Railroad from the village to the quarries is nearing completion, under the management of President Sortwell of the Wells River Road. The road is building from the village to connect with the Wells River road, four miles distant, thus giving another outlet for granite direct from the quarries.

We are not stock brokers or rate cutters. We are journalists with modern ideas, and patrons of the trades we represent. For our commercial standing ask anybody who ought to know.

GREEK MOLDINGS.

THE moldings which we ordinarily see used by builders and most of the architects, those most in common use, the moldings which we can buy at the planing mill in wood, those which are used by the stone-cutter in his regular stock work, are Roman. The moldings of the monuments of stock design are for the most part Roman in outline. Many of the so-called Gothic designs in monuments are finished with Roman details. These Gothic designs are so named because of their peculiar form, possibly of pointed arch or something of that kind, though rarely for good reason. It is sufficient to say that the moldings in most common use are of Roman origin, that they are taken from the Roman orders,—the Roman Doric, or composite, or the Roman interpretation of the Corinthian. Most of such moldings can be formed by rule. The circles can be struck by compasses; the fillets, etc., can be made with the square and triangle. Of the Greek moldings this is rarely true. The curves are of complicated forms. The fillets show at various angles, seldom exactly horizontal or vertical as to exposed surfaces. Roman moldings are made mechanically or by formula. Greek moldings are made thoughtfully, intelligently; made as suited to the particular place in which they are used. They are more thoroughly artistic in that they are made with a true regard for their appearance, and with a disregard for fixed formula. The crown mold of a Roman cornice is almost invariably an O G mold made in the same way. The form of the Greek cornice molding varies. It depends upon the light in which it is to be viewed, the distance from the ground—not only as to size but as to form—the character of the ornaments to be used, and altogether is most artistically conceived.

While the outlines of Greek architecture are simpler than those of any other known to us it is true that the details are more elaborate, more delicately conceived, more thoughtfully designed and executed than those of any other style of architecture known. In this connection we give the forms of various Greek moldings selected from the structures named. To blindly copy a Greek molding is a most absurd thing; to copy a Roman molding absolutely is a usual and common thing. The thing to copy in Greek architecture is the spirit with which it was imbued, the spirit of intelligence. The moldings were conceived with the idea of carrying out certain forms or emphasizing certain parts. Take, for instance, cut No. 1; there is the delicate formation at the top, in the strong light; the light fillet which casts a shadow on the plain surface below. All of this is clearly enough emphasized in two ways. First, the plain surface calls attention to the interruption, however slight, at the top. This simple molding, small as it is, will be clearly enough shown because it stands in the light and is contrasted with the plain surface below; then underneath the moldings that are in shadow and shade, while they are clear in outline, are emphasized by clearly cut recesses. In one place quite a little cove is shown. Notwithstanding the fact that this is small, and that it is in shadow, it will show a clear and distinct line when viewed from below. Thus it is that all of the moldings and items of Greek detail, while they are so fine and delicately conceived, show clearly and emphatically their exact form and detail.

In the formation of these moldings the artist or architect affects his purpose in very simple ways. If he wants a strong line, or wishes to emphasize a particular part, he does not do it as is so commonly the case with the Roman work, by enlarging the parts and calling attention to them in that way. He brings attention to the detail by strong contrasts of light and shade. A deep recess, however small, gives one kind of a line. A soft curve below it emphasizes it. A change in the direction of the surface brings about another contrast. A flat surface below without ornament of any kind calls attention to its surroundings.

Altogether the success of Greek architecture is owing to the intelligence of its conception. It is the architecture of intelligence, refinement and simplicity; it is the architecture to which all true artists lean most kindly. If we examine the moldings on the monuments and gravestones of one kind or another, it is clearly to be seen that not one monument in five hundred is designed by a person who is educated in the theory or practice of design. Moldings are made to fill in, and without regard to their best uses. For the most part they are distorted forms of the old Roman moldings.

In this connection we give a number of examples of what may be done in the line of moldings on buildings and monumental work. It is not uncommon to see moldings used on monuments which are large and heavy enough for tall buildings and massive structures. They are made to occupy a certain space without the knowledge of the means of doing it in a simple and proper manner. As we have said before, it is not so much the size of a molding as it is the way in which it is formed in regard to the effect of light and shade. This point can be clearly seen by reference to the examples here given.

A CARD.

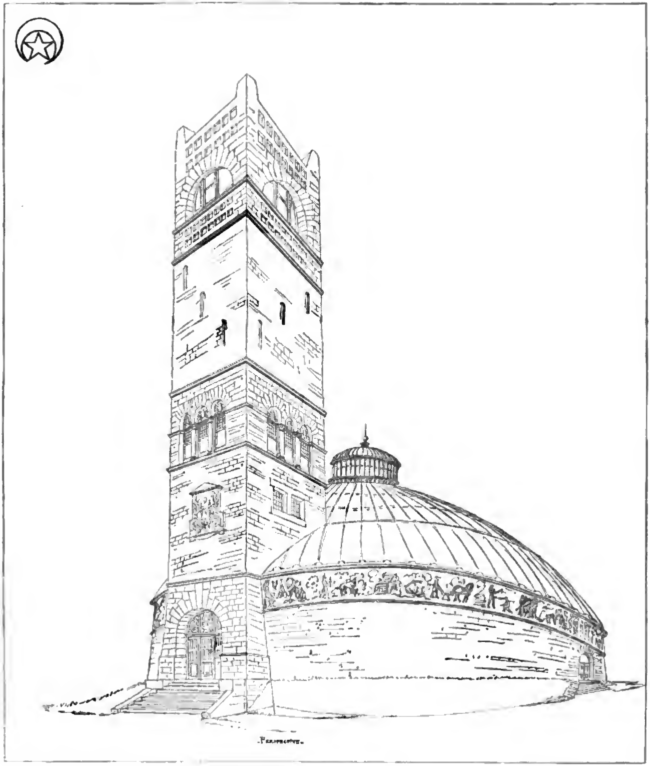
To the Trade:

GENTLEMEN: This yard will be permanently closed Dec. 31, 1888. The Vermont firms whom we represent have decided on this course, owing to the fact that they have other branches closely located to this city from which dealers can be readily supplied with stock. The territory heretofore canvassed by this branch will be divided as follows: Michigan and the Canadian towns along the river will go to the Detroit Marble Co. Indiana and Onio to the Cleveland Marble Co., and the few towns in Eastern Illinois to the Chicago Marble Co. A large stock is now being prepared to ship to Detroit, and dealers will find in all these yards a good assortment of rough and finished marble, and they intend to be in position to fill all orders promptly. In closing here, we desire to thank the dealers for their liberal patronage during the past thirteen years, and trust they will continue their trade with the Detroit, Cleveland and Chicago yards, where we can guarantee you will receive kind and courteous treatment.

After January 1, the books of the Toledo Marble Co., and also those of the Toledo Branch of the Producers' Marble Co., will be at Chicago, and all settlements will be made from that point. Please bear this in mind, and address all communications to the Chicago Marble Co., Chicago, Ill. The yard there will be under the management of H. D. Pierce, who will be pleased to see any of you when in that city.

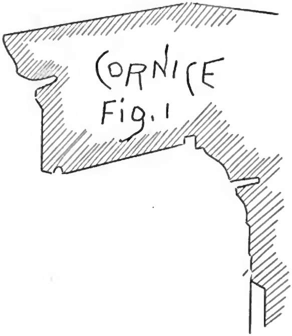
Yours respectfully, TOLEDO MARBLE CO.,
Toledo, O., Dec. 10, 1888. H. D. Pierce, Manager.

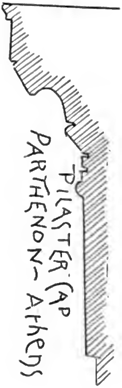
The Maine Granite and Improvement Company are busy looking after work for the coming Summer, and are already making bids on some pretty heavy jobs. Among others and the last was that on the postoffice and custom-house at Chattanooga, Tenn., their bid being about $235,000; and though they were not the lowest bidders they were lower than eight others. They made four separate bids on materials to be used in construction, namely, granite, sandstone, limestone and marble, having contracts for material with owners of such quarries. They are now preparing estimates on the new Government building to be erected at Wilmington, N. C.—*Waterville Times.*

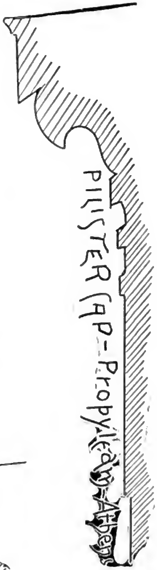


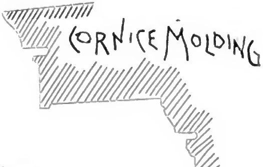
DESIGN FOR INDIANA STATE SOLDIERS' AND SAILORS' MONUMENT
By New England Monument Co., New York City.

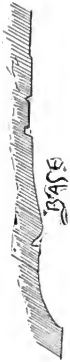
5422

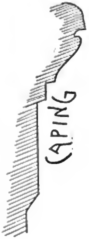

CORNICE
Fig. 1

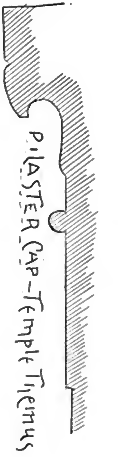

PILASTER CAP
PARTHENON—Athens

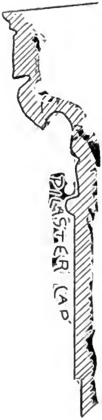

PILISTER CAP—Propylea—Athens

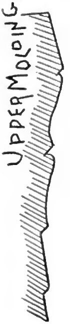

CORNICE MOLDING


BASE


CAPING


PILASTER CAP—Temple Themus


PILASTER CAP


UPPER MOLDING

ROCK HISTORY—IV.

WHEREVER a geological fact is observed there arises any number of suppositions to account for it, and the facility with which phenomena are distorted and pieced together to make a pet theory appear plausible is astonishing. Here is a man who believes that coal was formed in the same manner that peat is now, that an immense peat swamp was formed which in time became a coal field. Still another holds that coal comes from a buried raft of wood which was located at the mouth of some river, another contends that the resinous woods of the carboniferous period were exposed to a pressure which squeezed out their juices, and it is this which has coated them and preserved them as coal, and to all of these different theories are brought facts which attempt to prove them, while if a broad view were taken of the situation it would be found that each theory contained some truth and that it takes the combined truth of all of them to account for the formation of coal. If good hard sense, and a disregard for one's own particular pet theory were exercised, it would undoubtedly help geological science more than any other thing.

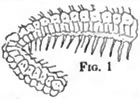


FIG. 1

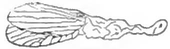


FIG. 2

While it is the flora of the coal measures which present the most of interest to us, the fauna is still to be considered. Had the vegetation of this period not been formed into coal it would have presented no more interest to us than that of any other period. In the carboniferous age the animal life is still mounting in the scale of progression. It is here that we find the first insects. Cut No. 1, is a representation of a centipede of that time, No. 2, of a dragon fly while No. 3, shows an insect which is allied to our spiders and scorpions. Insects of this kind were the only and first representative of land life then in existence. Hitherto it had been exclusively marine. Of life at this time Hugh Miller says:

"The wide continent before us is devoid of animal life, save that in its pools and rivers abound in fish and mollusca, and that millions and tens of millions of the infusory tribes swarm in the bogs and marshes. Here and there, too, an insect of strange form flutters among the leaves. It is more than probable that no creature furnished with lungs of more perfect construction could have breathed the atmosphere of this early period and lived."

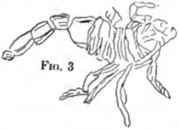


FIG. 3

Of our old friends we find that the brachiopods are about dying out and disappear altogether with the carboniferous age. Land shells and fresh water shells are beginning to be found in abundance. The corals are still here, although different in species. Trilobites are about to pass out, and fishes while they have passed the Devonian, the time when they ruled the seas, are still plenty and large in size. But it is in the carboniferous that the first undoubted trace of reptiles is found.

The class of reptiles may be divided into two sub-classes, true reptiles and amphibians. The amphibians have characteristics which ally them to both reptiles and fishes. Only this intermediate class is known certainly to have existed in the carboniferous age. The class of reptiles while it is first known is the carboniferous did not attain its best estate until later. The cut of foot tracks given in cut No. 4, is from this period, and was found in Pennsylvania. The stone which contains them is a sandstone and shows the cracks which formed while the softer material was drying before it became stone. Some of the footprints found in this region show the animal to have thick, fleshy feet about four inches long and making a stride of about thirteen inches.

At the close of the carboniferous period there had been extensive additions to the land surface of the North American continent. There were added the extensive coal fields of Pennsylvania which extend south through Tennessee. Connected with this field by sub-carboniferous rock is the central coal field which extends through Western Indiana and Central Illinois and western field of Missouri and the states south. The carboniferous has outcrops in Michigan and Nova Scotia and smaller ones in other localities. There is in the United States much coal which does not belong to the carboniferous period but which was formed later.

It was at the end of the carboniferous period that our first system of mountains appeared. Previous to this time what then existed as land was one vast plain with only an occasional elevation. In other parts of the world huge volcanoes were in constant activity. This was particularly the case in South America, Africa and Asia. But in North America there had been so little of volcanic action as to make it unworthy of mention. But, as said, toward the end of the carboniferous period the Appalachian Mountains appeared. The readjustment of the cooling, contracting crust of the earth over the molten interior instead of appearing in other ways came in a great folding of the crust, in the uplifting first of the main system of the Appalachian Mountains and afterward in the formation of the secondary ranges. It is probable that the uplifting of these mountains was gradual, that it was an uplifting or expansive movement instead of being a great sudden, terrible grinding together of broken edges. The strata in these mountains are so little disturbed when compared with those of other mountain systems that it goes to confirm this supposition. The uplifting of great mountain chains made a material change in the temperature of the continent. Before this, the climate was uniformly warm. This is proved by finding fossils of vegetation in the extreme North. The mountains changed the currents of air and

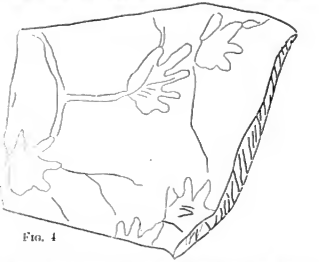


FIG. 4

helped among other things to produce the marked change of climate which then occurred, there being a cooler atmosphere at the poles and the warm one at the equator. The Rocky Mountains were formed much later than the Alleghanies. At the time in question the space occupied by the extreme western part of the continent was still ocean with only a few of what are now Rocky Mountain peaks appearing as islands.

HOW TO MODEL IN CLAY.

ARTHUR SEYMOUR JENNINGS.

THE practical value to the mechanic of some acquaintance with the art of modeling in clay is not generally understood. To know exactly how a piece of work will look when finished is frequently of material advantage in executing it, but it often happens that one can scarcely get an adequate idea from an ordinary working drawing, and hence the mechanic will be compelled to make a rough wood or metal model. The same result may be arrived at, by forming the model in clay, and at a very great saving of time and material.

Modeling in clay may be used for a number of purposes: Stove-founders, plasterers, picture-frame makers, gas-fixture makers, pressed zinc workers, and silverware makers, are among those who use it to a greater or less extent. But there are other trades in which it can be used to great advantage, as for example, by cabinet-makers and carvers, machinists, wood and metal pattern-makers. In short, wherever the form of the required piece cannot properly be appreciated from drawings, clay models of it will greatly assist in arriving at an exact form. Clay is cheap and may be used over and over again.

The clay employed for the purpose of modeling can be obtained from a pottery, and should be selected as free as possible from stones and other imperfections. In getting the clay ready for use it should first be chopped (an old hatchet or piece of band iron answers the purpose) and sufficient water added to it to render it soft enough to hold well together, but not enough to make it sticky. Care should be taken that it is uniform in consistency throughout, and if there be some quantity of it required for the work on hand it should be formed into the shape of bricks to facilitate handling. When the clay is not used for some time it should be covered with some old bags or burlaps, and water be occasionally sprinkled upon it from a watering can, which will keep it in condition.

If it should get dry it may be taken to a pottery and passed through the grinder. In cases where it is intended to model the clay for very small or fine work—such as picture frames, etc.—and it is wished to take a cast from it, it would be necessary to entirely free the clay from grit, the least of which mars the finish of the cast. To do this the clay should first be dried and then be well pounded in a mortar, and should then be run through a sieve, and sufficient water added to give it the proper consistency.

Having the clay ready, the next proceeding will be to form a frame upon which to model the clay. The shape of this frame will of course depend on the style of the design. If it should consist of a shallow design, such as a pressed frieze, a frame will be unnecessary, and the clay may be modeled directly upon a plain board or a stone slab. Where a frame work is employed it should approximate the general outline of the required figure, and be sufficiently strong to hold the weight without fear of slipping upon the body of the frame. Small pieces of wood should be tied to it by means of wire or sharp pointed pieces of zinc stuck in the wood to assist in holding the clay in its proper position.

The frame being prepared, the clay is now pressed around the frame and formed up to the shape of the required figure. The best tools to use are the hands. But assistance may be had in paring off the clay from a piece of wire turned into the shape of a triangle with the end turned out to form a handle, one side being ground down to an edge.

After a figure has been formed somewhat similar to that required, the operator should proceed to take off a little here, and put on a little there, as may be required, frequently taking measurements by means of compass and callipers, so that the exact shape may be obtained. A regular set of modeling tools may be bought for the more delicate operations. These tools are made into a number of shapes and sizes and the number of them required will depend largely on the character of the work on hand. No portion should be finished off, until the whole is of the shape desired. The success of the whole operation will depend largely upon the manner in which the workman builds up the model from the drawings.

In cases where the model is a large one, and requires several days for its completion, the clay is likely to get dry and crack, to prevent which it will be desirable to cover it with wet cloths until it is again being worked upon. By keeping such cloths on whenever the figure is not being worked upon it may be kept for an almost indefinite period. The beginner will find it to his advantage to practice freehand drawing in order to obtain judgment in measuring forms and distances by the eye. Practicing right and left hand curves is also recommended as it will be useful in obtaining the two sides of a figure equal to one another.—*Mechanical News.*

We have many hundreds of subscribers. We want many thousands to put STONE where the trade would like to see it.

HUNTING FOR "ROCKING STONES."

Professor Henry Beals, a fellow of the Royal Society of London, is in New Haven, completing the work of making a study of the erratic bowlders which are so common in New England and on the north side of Long Island. His search for "rocking stones" has been made in conjunction with geologists on the continent, who are seeking to establish beyond controversy the theory that these great rocks and curiously balanced stones, which in many instances are as large as a small house, were carried on floating icebergs during that mysterious era known as the glacial period. The Professor says he is more than ever convinced of the truth of this theory. Of the rocking stones he has discovered but one new example at Noank, Conn., on the farm of Caleb Haley, a New York fish-dealer. Only one other stone is known of in New England, that at Lanesboro.

A photograph has been taken of Mohegan Rock in Montville, Conn. It is 45 feet high and 70 feet long, and is calculated by scientists to weigh 10,000 tons. Professor Beals says the next largest rock of the glacial deposits in New England is that in Nottingham, 62 feet long and 50 feet high, and weighs 6,000 tons. He says that the bowlders strewn along Long Island are all much smaller than those found in New England.

The Plymouth rock on which the Pilgrims are said to have first stepped ashore, he calls an erratic bowlder of syenite, supposed to have been moved by the ice from the Roxbury ledges near Boston. —*Boston Advertiser.*

A deposit of stone which is said to resemble marble has been discovered on a farm at Bolton, Lake George, N. Y. The stone was found by a man in search of soapstone. A number of men are at work in the new quarry.

[Concluded from November Number.]

STONE AND MARBLE OF GREAT BRITAIN.*

THE magnesian limestone, or dolomite, as it is sometimes called, has obtained a not very enviable notoriety from its having been selected for the Houses of Parliament at Westminster. The name dolomite belongs properly to a mineral of a peculiar granular and crystalline structure known as bitter-spar, which consists of 54 parts of carbonate of lime and 46 parts of carbonate of magnesia, the name being derived from that of a French geologist who discovered it in the Alps. The magnesian limestones are very variable in their character, both as regards their chemical composition and physical structure. The stone used for building purposes is chiefly obtained in this country, from the counties of Nottinghamshire and Yorkshire, in the district which lies between Mansfield and Chesterfield, stretching in a northern direction as far as Tadcaster. The quarries in the neighborhood of Tadcaster were known to the Romans, who employed this description of stone in the multangular tower, the ruins of which, in the Museum gardens at York, are still an object of interest. York Cathedral, erected in the 13th century, Ripon Minster, as well as many of the churches in York, are built of this stone, in many of which the signs of exfoliation and decay are but too evident.

The selection of magnesian limestone for the Houses of Parliament was decided upon chiefly on account of the very excellent state of preservation in which this stone was found at the cathedral church of Southwell, in Nottinghamshire, Roche Abbey, near Tickhill, and the castle of Coinsborough and Bolsover. The particular stone chosen was that from the quarries at Bolsover. in Derbyshire, whence the stone used for the church at Southwell had been obtained. The stone that could be supplied from these quarries was, however, found to be too small in quantity for so extensive a building, and blocks of sufficient size were not procurable; other sources of supply had consequently to be found, and the North Anston quarries, on the borders of Yorkshire, were determined upon.

The choice of magnesian limestone, notwithstanding all that has occurred, in connection with the defective condition of many portions of the building at Westminister, cannot be regarded as an erroneous one. Magnesian limestone had long been regarded as offering an excellent material for building purposes. It was, in the opinion of Sir Christopher Wren, only inferior to Portland, and examples are not wanting which afford evidence of its capability of bearing exposure to such an atmosphere as that of London without injury, of which the Museum of Practical Geology, in Jermyn street, may be quoted as an instance. The greatest care was taken in selecting the kind of stone to be used; a royal commission was appointed, consisting of men eminent for their geological attainments as well as for their practical experience, who undertook a laborious investigation, visiting all the quarries in England, and examining 150 varieties of stone. The cause of the unsatisfactory condition of much of the stone employed in the building is unquestionably due to want of inspection at the quarries, and—as a necessary consequence of this laxity of superintendence—the inefficient manner in which the stone was worked. We find stones taken from the same part of the building, varying materially as regards their porosity and physical character, to such an extent as could not possibly have occurred had proper precautions been taken for preventing the arrival in London of any stone of inferior quality. The securing a proper supervision over all quarrying operations is of quite as much importance, as care in the description of stone most suitable for any building operations, of the truth of which the Palace of Westminster affords, unfortunately, plenty of evidence.

A very excellent stone of this class is obtained from Huddlestone, situated between Sherburn and Tadcaster, consisting of 54 per cent. of carbonate of lime, and 41 per cent. of carbonate of magnesia, of which we have an example in London in the cross erected in front of the Charing Cross hotel.

Building stone of good quality is obtained from various parts of the magnesian limestone district, differing in composition as regards the relative proportions of lime and magnesia.

The nearer the composition of the stone resembles that of true dolomite, and the more crystalline is its character. the better building stone is it likely to prove. The Bolsover stone, originally selected for the Palace at Westminster, contained 51 per cent. of carbonate of lime, and 40 per cent. of carbonate of magnesia.

It would be useless to attempt to give anything like a detailed account of the vast number of very excellent building stones with which this country abounds, but I shall endeavor to make a selection of such as may best serve to illustrate the chief difference that exist between them, both as regards their chemical composition and physical structure. In examining a specimen of stone our first inquiry would naturally be directed towards ascertaining its chemical composition, so far, at all events, as would be requisite for deciding upon the class to which it belongs, whether it is a sandstone or a limestone, or partakes of the character of both. Having determined this point, we should ascertain the condition in which its constituents exist, whether crystalline or otherwise, and proceed to a careful examination of its physical properties generally, such as its hardness, density, and strength, and also its porosity, as shown by the amount of water it will absorb. It is upon these physical properties that the value of a stone mainly depends, for we find sandstones containing very nearly the same amount of silica, or limestones containing the same proportions of carbonate of lime, and yet differing widely from each other in their relative value for building purposes, their durability or otherwise being mainly dependent upon their physical structure.

In conducting an investigation of this nature, the examination of sections of stone under a microscope will afford much useful and valuable information as to the nature and character of the minerals of which it is composed. As regards the most practical tests, it is very desirable, if not absolutely essential, that they should be conducted in as uniform a manner as possible, otherwise the results obtained are no longer capable of being compared with each other, and consequently lose much of their value.

The capability of stone to resist a crushing force is usually stated in the circulars issued by quarry owners, as being represented by the number of pounds per square inch, or tons per square foot, which it is capable of bearing without breaking; but these results are not strictly comparable with each other unless the tests have been conducted in the same manner, and with blocks of the same size. The method most generally adopted, is to subject 6-inch cubes, bedded between pieces of pine three-eighths of an inch in thickness, to hydraulic pressure, noting the amount of force obtained when the first crack makes its appearance, and also when the crushing takes place. Another useful test of the strength of stone is to expose repeatedly, small slabs saturated with water, and inclosed in a metal case, to a freezing temperature.

The density may be taken approximately by simply weighing 6-inch or 12-inch cubes, if carefully cut; but for more accurate determinations, the usual manner of taking the specific gravity of solids by ascertaining the difference in weight in air and when immersed in water, may be resorted to. For this purpose, small l-inch or 1½ inch cubes are the most convenient sizes. The specimens, previously dried and weighed, should be rendered impervious to water by immersion for an instant in melted paraffin, or by coating them with a thick solution of shellac in methylated spirits, and again weighed. The difference between the specific gravity of paraffin or shellac, and that of water, is not sufficient to give rise to any serious amount of error, while the necessary correction for this difference can be easily calculated for, if greater accuracy be desired.

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*A lecture delivered before the British Society of Arts, by W. Y. Dent, F.C.S., F.I.C.

In drying specimens of stone, care should be taken to avoid too high a temperature; if time allows, it is preferable to do so by simply exposing them to the air of a warm room, and under no circumstances should the temperature be allowed to exceed 212° Fahr. When dried rapidly at this temperature, the specimens should be allowed to remain for an hour after removal from the drying chamber, in order that they may cool down and take up their hygroscopic moisture before weighing. The variations that exist as regards density in different kinds of stone are considerable. The lighter descriptions, such as Caen and Bath stone, weigh from about 117 pounds to 123 pounds per cubic foot, while the heaviest, such as granites and marbles, will weigh from 165 pounds to 175 pounds.

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STRANGE INTERPRETER.

Many persons have seen something of Etruscan monuments or sculpture, and probably know that until within a few years the inscriptions accompanying the sculpture had never been deciphered. Although the cuneiform writing of Mesopotamia, consisting of characters entirely different from those of any known language, was soon understood, there seemed to be no key to that of the Etruscans. Very recently, however, a key has been found—strangely enough, in a modern language, or, at least, one which is still spoken by six hundred thousand people; and not only has this well-known language of the Basque province of Spain served to interpret the writing of a people which was ancient before the wolf nursed Romulus and Remus on the Capitoline hill, but the relationship seems plainly to connect the modern Basques with the Pelasgi, those strange wanderers whose settlements extended from the Euphrates to the Atlantic. Singularly enough, the Basques have no ancient inscriptions or manuscripts, their language having been written only for three or four centuries, so that the allied portions of the Etruscan inscriptions are selected by comparison with words which have been preserved by oral transmission only for at least three thousand years.—*Brick, Tile and Builders' Gazette.*

A writer in *Nature*, who says he has measured a great many Roman coffins, finds that the Roman could not have greatly exceeded five feet five inches. From the measurement of ancient armor it appears that the English aristocracy have decidedly increased in average height within 500 years. The mummy of the celebrated Cleopatra measures about fifty-four inches, about the height of the present European girl of thirteen. The most ancient mummy of the Egyptian king yet discovered measured fifty-two inches.

B. L. Pease, for some time foreman in the building marble department of the Vermont Marble Co's. work, has been assigned for duty in charge of the Detroit Marble Co.

INCREASED USE OF STONE.

The production of stone is on the increase. New quarries are being opened all the time. The quality and quantity of good building stone is being more fully realized by everybody. What can be done to increase its use? One thing leading to this end is the adoption of improved machinery for stone-cutting that will reduce the cost of the output. Anything which will do this either in the quarry or in the yard will increase the use of stone in all directions and at the same time pay a better profit to the quarryman and stone-cutter. It will help everybody, laborers and all alike. Nothing can be truer than the fact that labor-saving devices operate directly to the benefit of the laborers and those interested in production. By the increased use of the material the cost is effected. Stone-cutting may be conducted as a manufacturing business. The best results to the public and the stone-cutter cannot be realized until this is done. Those in charge of stone-yards as to the figuring on work alone are usually men without business training. There are good stone-cutters, hard-working, intelligent go-ahead men. Their qualifications for the business consist principally in their ability to do work themselves and to have it done. They are what are called practical men. Such men are excellent as help, as foremen of yards, but are rarely what one would call good business men. They know the cost of stone-work along certain lines in general terms, but there are certain items of cost such as office expense, insurance, waste, taxes, depreciation of plant and incidental expenses which are not taken into account. Under such administration it frequently happens that year after year of hard work pass by with little or no advance in a pecuniary sense. What is wanted is good hard, practical business sense in the quarrying and stone-cutting, monumental or other lines which have to do with this material.

NEW ORLEANS BUILDING.

One of the cities to be touched by the boom, that colossal wand of enterprise and prosperity, is the city of New Orleans. Splendid structures of metropolitan character seven and eight stories high, built of granite, brownstone, pressed brick and terra cotta are being constructed in large numbers in that city. This is in remarkable contrast with the plain two and three-story structures of an almost temporary character which are so common in the business portions of that city. At the present time a stock company with $3,000,000 paid up cash capital is being organized for the purpose of building a hotel, than which nothing is more needed in the city of New Orleans. The only thing first-class about the principal hotel in New Orleans is its price. In it there are none of the other qualities of a first-class house. Large investments of northern capital have been made in New Orleans. The city, however, is not dependent upon the Northern capitalists for its prosperity. The residences of New Orleans have been born again. They have been converted. The money for the hotel, the subscriptions for advertising the town, taxation for a complete sewage system, increase of water facilities, a belt road and a general cleaning up is the work of its own citizens. They have been baptized with the spirit of enterprise. In the language of the revivalist they are saved. To one acquainted with New Orleans all this seems strange, but the spirit of this improvement now applies to everything, the management of its stores, its theatres and every industry connected with that city. The seed was sown during the years of the exposition. During the last few months the returns have been surprising. The building boom is now on. Other improvements are being organized. The tax has been levied so as to make all public improvements necessary.

THE INDIANA S. S. AND S. MONUMENT—VIII.

THE design presented this month is from the New England Monument Co., of New York City.

The tower which faces the new capitol building is 30 feet square at the base and is 140 feet above the surrounding roadway. The inner mound of Circle Park being graded up four feet above its present level so as to give increased height and importance to the structure.

The main entrance to the memorial hall through this tower is 16 feet wide, wide enough to enable a military organization to march through without breaking file. In the center of this tower is an elevator of the most improved construction, which ascends to the roof of the tower, which is arranged as a lookout or post of general observation of the city and its surroundings.

On the ground floor on either side of the tower are wide iron stairways connecting with the principal floors of the tower, which it is the intention to use as a balcony, in connection with the memorial hall for reviewing, speeches, etc.

On the face of the tower over entrance it is designed to place carved in stone, the state coat of arms.

The memorial hall which is circular in plan, has an outside diameter of 125 feet, which gives an inner diameter of about 120 feet, this hall will have a standing capacity of about three thousand people, making a room large enough for military re-unions, or for other purposes that such a structure might be used for.

The wall space in the niches can be used for mural decoration in design, or for painting historical state or war scenes, the faces of these buttresses are wide enough to receive bronze tablets, giving history of state, or of the different regiments, or battles that were participated in by the citizens of the state.

The memorial hall is lighted from the roof, part of which is constructed of heavy glass, thus insuring a soft pleasant light.

CONTRACT BIDDING.

BIDS on work of all kinds are universally irregular. Take as an instance a brick house of the minimum cost of $4,000. The bids from a well-made set of plans and specifications will range as high as $6,000 and $6,500. In the case of cheaper work there is no greater difference. There will be the same wide range in the bids. Why is this? It may be suggested that it is because bidders on the smaller work are not as fully posted as to values. If that is true how does it happen that upon the heavier contracts, buildings to cost between $200,000 and $300,000 that the range is quite as great? We have in mind a competition in which buildings were to be erected, the cost of which according to the lowest bid was $300,000. Bids ranged from that figure to $425,000. The bids on the government work are very commonly of this irregular character. We have been observers of these facts for a good many years.

There is a class of bidders upon government work whose ideas of values are more uniform than those as above stated. There are certain firms who bid on government iron work and other large contracts whose figures do not vary greatly. There are others in the same line of business who are up and down,—irregular. The more uniform bidders are those who conduct their business in a very systematic way. They know the exact cost of everything they handle. Not only in aggregate but as to detail. They know what each particular part of each contract costs. They have a basis of value. When it comes to figuring on work they are not only able to take off their quantities accurately but may fix values according to definite knowledge. Bids for stone and stone-work upon large contracts are universally irregular. This is true not only as to the stone itself but upon the work of preparing it. There is a reason for this. There are very few proprietors of stone-yards who have definite data as to the cost of the different kinds of work when considered in detail. One can take a design of a certain piece of molded stone work and submit it to a dozen contractors on cut-stone work and get a dozen different bids which will vary 30 or 40 per cent. as to the labor involved and its cost. This is because it is all guesswork. A cutter or contractor may feel that he can tell just what it will cost a foot to do a certain kind of work. He may have great confidence in his judgment yet there are very few contractors who can accurately make figures on work from known facts. Their impressions as to values have never been proved. They have no detailed ideas as to cost which have been confirmed by definite experience. They may know how much a particular job costs them; very frequently they do not know that. Hence there are as many different ideas as to values as there are men. This leads to dispute and at times expensive litigation.

If different contractors vary as to their value on work why is it not equally probable that the superintendent, architect or engineer will vary from the contractor as to his valuations? Particularly when it is true that the engineer and those who occupy that position with reference to the work is a bear on prices; that is, he is always for the lowest when the contractor's natural state of mind under such circumstances is for the highest price. Hence all the trouble about bills of extras. Both sides may be conscientious and still be widely apart. The difference in values in bidding on work is conscientious for the reason that there is no object in being otherwise. While it is true that the variation as to cost, or idea of cost, may be on account of a lack of knowledge as to what costs actually are. It is also true that certain kinds of work can be done cheaper by one contractor than another. One may be fitted for doing work of a particular kind at a certain low price. Another establishment may not be so well equipped along the same line. It will cost them more to do the same work. Hence a justifiable difference in the ideas of values. There are those who bid upon work who have a definite system as to their method of bidding.

Usually bidding among stone contractors is without system. Take as an instance, the beginning of the building season in the early spring. Everybody wants work. Everybody is bidding on it, a good many at a low price. They want to be doing something. The low bidders are getting all the work. In a short time they are loaded up with all they can do and are complaining that there is no money in the business. About this time another party steps in and gets some work at good prices for the reason that others are full of cheap work. Has he not been bidding before? Yes but he has been bidding to get a fair living margin. He has no cheap work. Everything that he has is at a fair price. He can afford to do it well. The work gives good satisfaction. He receives certain advances. On the other hand those who take the cheap work have to skin around in every way to get out even. The result is dissatisfaction, increased expense in righting things and eventually a loss.

Their energy is spent in doing work the second time. Those who bid and do work in this unsystematic way work up nearly everything they have before they begin to look for something else. As long as they are busy they are not bidding for work or if bidding on it at all are putting in ridiculously high figures. This is not right. A good thing to do is to bid on everything that comes along calculating on a fair profit. The result is general satisfaction to those who have work to let, and constant, at a fair profit to the contractor. This is the plan pursued by some of the most successful bidders in the country. They figure on everything in their field. They are full of business all the time, their name is constantly before the public, they are continually taking in good contracts. The result is profit and wealth.

NATURAL CEMENTS.

Limestone, with intimate, fine-grained admixtures of silica, alumina, magnesia, etc., in quantities of 35 to 60 per cent., are called cement stones. The high percentage of silicates causes a separation of the alumina from the silica during calcination at red heat just sufficient to expel the carbonic acid.

Oxides of iron and chlorides of potash are generally present in small quantities. They assist hydraulicity and crystallization. A cement of porous, friable, globular texture, with a specific gravity of about 2.7, is obtained. It contains silica and alumina in soluble state, and hence the lime can easily act on either, according to affinity, when water is added for mixing and hydration.

The burned lumps must be pulverized before they will combine with water when they form hydrated silicate of lime, while the alumina remains practically inert. These cements do not heat up, nor swell sensibly while they are mixed. They set quickly, but harden slowly under water without shrinking, and attain, gradually, great strength, with well-developed adhesive force.

The color of these cements gives no clue to their cementitious value, since it is chiefly due to oxides of iron and manganese, which bear no relation to hydraulic properties.

To insure efficient chemical action in hardening, the grinding must be carried to the production of impalpable powders. These cements bear doses of sand of double their own volume or over. Mixing pure cements, from 30 to 40 per cent. of water must be added.

Many American cements of this class contain large percentages of carbonate of magnesia. The tests of strength, in pure state, as well as mixed with sand, compare well with the cements which do not contain these combinations.

These cements have good adhesion to stone and bricks, because they pass with their surplus water slower than the others. Whenever judiciously selected and conscientiously manipulated, they have given full satisfaction. Many causes co-operate in affecting rocks of the compound character required for the production of hydraulic cements.

Deleterious material is disseminated through the various strata of a quarry in constantly and widely changing proportions; each stratum exhibits heterogeneous features, hence it taxes judgment begotten of large experience, honesty, carefulness and skill to keep up reasonable uniform quality.

Different quarries show dissimilar stones; the best brands vary greatly in chemical composition. Fineness, density, thorough and homogeneous mixture, humidity, accessory ingredients, enter largely in the problems. To preserve the activity and strength of the natural cements for a longer time, air and moisture must be excluded by careful packing and dry storage of the barrels, otherwise the premature production of carbonate of lime will interfere with the subsequent hydration.

De Smeth found for our native Virginia cements in pure state, after 30 days' exposure, 170–250 pounds tensile strength per square inch, which increases in eleven months to 316–381 pounds. Mixed with equal portions of sand he obtained from 116–195 pounds, and L 80–L 90, as above.

Gilmore states the adhesion of Rosendale cement to the front bricks, after 28 days, when pure, to be 30 pounds, and mixed with one and two parts of sand, 16 and 12 pounds.

Clarke reports the tensile strength of Rosendale cements, pure:

After 1 and 12 months, as	145 to 290 lbs.
And mixed 1 : 1 after 1 and 12 months	116 to 256 lbs.
1 : 2 after 1 and 12 months	60 to 180 lbs.
1 : 3 after 1 and 12 months	35 to 121 lbs.
One cubic foot of Rosendall cement weighs	49 to 50 lbs.

The proportion of tensile to compressive strength averages probably after one month 1 : 4, and rises probably, after two years, to about 1 : 6. The specifications of the engineer department of the District of Columbia, require, seven days after mixture for neat natural cement 95 pounds, and for mixture with one and two parts of sand 56 and 22 pounds tensile strength per square inch.

The gradual increase of strength by time is carefully noted, and establishes the reputation of the accepted brands.

NATURAL PORTLAND CEMENT.

Natural Portland cements are manufactured in those rare cases where rocks are traced, which contain combinations of lime and silicate of alumina in the chemical proportions and physical conditions found necessary for producing artificial Portland.

The treatment then differs from that of ordinary cement only in the higher temperature for burning. There are extensive works of this class around Perlmoos in Germany, Grenoble in France, etc.—*Adolph Cluss, Washington D. C.*

SEDIMENTARY FORMATIONS.

We take a glass of water and put some gravel into it. The gravel at once sinks to the bottom and remains there even though we stir the water briskly. We close the mouth of the glass and shake it up and down so as to mix the water and gravel thoroughly together; but as soon as we cease to do so and place the glass on the table again, we see that the gravel has sunk and formed a layer at the bottom. This layer is a *sediment of gravel.*

Instead of gravel, we put sand into the water and shake them up as before. We mix them so completely that for a moment or two after we cease, the water seems quite dirty. But in a few minutes the sand will have sunk to the bottom as a layer below the water. This layer is a *sediment of sand.*

We take a little mud or clay, instead of either the gravel or sand, and shake it up in the water until the two are thoroughly mixed. When the glass is replaced on the table this time, the water continues quite dirty. Even after some hours it remains still discolored, but we see a layer beginning to appear at the bottom. If the glass is allowed to stand long enough undisturbed, that layer will go on growing until the water has again become clear. In this case the layer is a *sediment of mud.*

Sediment, therefore, is something which after having been suspended in, or moved along by, water has settled down upon the bottom. The coarser and heavier the sediment, the quicker will it sink, while when it is very fine it may remain in suspension in the water for a long time.

Sedimentary rocks must thus be those which have been formed out of sediments. And just as sediments differ from each other in coarseness or fineness, so will the sedimentary rocks formed out of them.

Take three pieces of sedimentary rocks—a piece of *conglomerate*, or pudding stone, a piece of *sandstone*, and a piece of *shale*. Examine the first of these three pieces. You will find it to be made of rounded little stones, firmly cemented together. Were these round stones to be separated from each other, and gathered into a loose heap, you would call it a heap of gravel. The stone is evidently nothing more than a hardened gravel, such as you might pick up on the seashore or in the channel of a stream. It is sometimes called pudding stone, because the stones lie together somewhat like the fruit in a plum pudding.—*Manufacturer and Builder.*

THE INDIANA MONUMENT.

BELOW is given a general specification as to the selection and quality of stone work for the Indiana Soldiers' and Sailors' Monument. The extracts from the specification will give all necessary information to those having in mind to consider the matter of making proposals. All bids must be in by Jan. 30, 1889. See advertisement on another page of this issue.

KIND OF MATERIAL.

All stone material for this monument shall be best quality oolitic limestone, except as hereafter provided, approved by the commissioners. All exterior parts, including the facing of the circular wall with its railing course, shall be a well selected, fine-grained oolitic stone, free from natural defects, and must be uniform in color, even in texture and strength, and subject at any time prior to the final acceptance of the work, to be rejected by the commissioners, if found to be defective or unfit. Interior blocks may be of any other kind of sound and durable oolitic limestone approved by the commissioners, which is free from defects, and shall be subjected to the same right of rejection during the progress of the work as is provided above for exterior stone. The bidder will be required to give the names of two or more quarries, with their location and name of owners, from which he proposes to execute the work, under these specifications, and should the contract be awarded to him he will be required to furnish samples of the stone as a standard, each of the blocks to be marked by him for the purpose of identification. The steps, the floors of platforms, shall be of best quality Putnamville or Deputy class of stone. No stone for the superstructure will be accepted unless the same be obtained from a quarry within the state of Indiana; bidders, however, may bid upon gray granite for the steps and fronts of platforms in addition to said other class of stone, stating, specifically, the additional cost, and the quarry from which the granite is to be obtained, in what state situated, and the name of the owner.

DIMENSIONS OF BLOCKS.

The monument to be constructed with blocks of sizes determined on the drawings. All mere false joints thereon assumed for diminishing the sizes of blocks, or for the sake of proper bonding, are indicated on the drawings with purple lines, and shall in no case be made to exceed one-eighth of an inch in width and be grouted with soft mortar. Inside head joints shall not be to exceed one-half of an inch in width.

The following is a list of Indiana oolitic stone quarries given by the Monument Committee:

Big Creek Stone Co., Bloomington, Ind., or M. W. Mansfield, superintendent I. & V. R'y, Indianapolis; Chicago Stone Co., Bedford, Ind.; Crim & Co., Bedford, Ind.; Chicago and Bedford Stone Co., Bedford, Ind.; Dark Hollow Stone Co., Bedford, Ind.; Indiana Oolitic Stone Co., Stinesville, Ind.; Heaps & Simmons, Spencer, Ind.; Hoosier Stone Co., Bedford, Ind; Matthews Bros., Ellettsville, Ind; Perry Bros., Ellettsville, Ind.; David Reed, Bedford, Ind.; Romona Oolitic Stone Co., Indianapolis, Ind.; Salem Stone and Lime Co., Salem, Ind.; Terre Haute Stone Co., Stinesville, Ind.; Wolfe Oolitic Stone Co, J. S. Williams, Bloomington, Ind.; Monon Limestone Co., or W. T. Davis, Indianapolis, Ind.

CONSTANTINOPLE CEMETERIES.

At Constantinople the big Mussulman cemeteries are sights that every visitor goes to see. From the comprehensive outlook of the Saraka or Galata Tower, a panoramic view of the city embraces forests of dark cypress here and there. The black masses of woodland stretch along the Golden Horn, and encompass the city on every hand. They are the famous cypress graveyards of the Ottoman capital, and well worth visiting, as nothing like them is to be seen elsewhere. These cemeteries may best be described as dense forests of cypress trees and tombstones—tangled masses of graves and trees. The cypresses have grown to enormous proportions, and the dense, dark foliage forms a ceiling through which the sunshine penetrates only in streaks. The cathedral aisles of the trunks, and the tablets of the dead, are bathed in twilight all day; on moonlight nights the dark cypress cemeteries are weird pictures, indeed. The Constantinople headstone is a rude representation of the human form, with a fez or turban chiseled on the top, so that on these moonlight nights they may well be taken for crowds of ghosts. In these Constantinople cemeteries, too, one may read a rare essay on natural economics. Whence comes the remarkable vigor and thrifty appearance of those thousands and hundreds of thousands of huge cypresses? The other hills and vacant areas around about them are barren, and trees planted thereon and left to take care of themselves would hardly survive. Whence, then, come the giant growth and the dark, almost black, glossy foliage of the cemetery forests? The Turkish custom of crowning their gravestones with a representation of the head-dress worn by the departed during life, furnishes a ready index to the age of the grave, apart from the epitaph. Side by side one sees in the Constantinople cemeteries the huge turban of the time of Mahmud II, and the modern fez, the former still a mass of gilt, the latter painted red. But the most impressive feature of the cypress cemeteries, and that which appeals particularly to the imagination of the western visitor, is the way the headstones are crowded together. In spots they are literally placed as thick as they can stand, a mass of upright slabs through which one could hardly force a path. In other places they are toppled over, and lie like fallen sticks of timber one over another. The dead of different periods must have been buried one on top of another, and new bodies wedged in wherever enough soil was found to cover them up. Well might the proud old cypresses lift their glossy heads skyward and increases their swelling girth.—*Thomas Stevens, in New York Evening Post.*

MONUMENTS OF AN UNKNOWN RACE.

Unhewn stone monuments are among the most interesting relics of prehistoric man found in France and other portions of Europe, the ancient province of Brittany being especially rich in them. The builders, Mr. Thomas Wilson states, are supposed to have come from a more or less remote east during the polished stone age, bringing a knowledge of agriculture, some ideas of government and a religion, with less of art than the inhabitants of the country before them possessed. They buried their dead, and left the magnificent monuments over them which, to the number of more than 6,300 in France and more than 1,600 in Brittany, are now being carefully restored and preserved by the French government. Some of these monuments are made up of many immense stones, while others are really collections of monuments in great numbers.

The works are known by various names. A menhir is a large stone standing on end; a dolmen, a table like tomb; a cromlech, a circle of stones; an alignment, lines of menhirs; and a tumulus, a mound of earth or stones usually covering a dolmen. Many of the monuments must have disappeared, but all these remain, dotting the country in every direction, enormous, rough, rude, unhewn granite stones—belonging to another civilization, mighty in its time, but now dead and buried in the ages of the past, with no inscriptions and no history.—*Arkansaw Traveler.*

The stone, marble and granite trades called loudly for a representative technical journal. We answered. Now give us your support.

In 1418, 4,000 bullets were ordered to be made of stone from the quarries of Maidstone, England. They were for cannon. Iron bullets were made for the same purpose in 1550.

The Essex Junction (Vt.) Marble Works, formerly the firm of Young, Bailey, Snyder & Fletcher, will henceforth be known as the Fletcher & Company's Marble Works.

KATIE O'BRIEN.

"DID you notice the young lady who just passed here?"

"The one with the green shawl thrown over her head? the ugly one?"

"No. The one with the sealskin sacque. The pretty one, of course."

"Well, you may know I noticed her. What about her?"

"Well, that is just what I was getting at. Do you remember Mike O'Brien, an Irish stone-mason who used to work around here and owned something he used to call a stone quarry?"

"I think I do, I think I knew him about three hundred dollars worth one time and another. He used to make such awful good promises that he would catch me about twice a year for fifty or seventy-five dollars and that is more than any other man around here could do with me."

"Mike was a pretty hard customer in his way and then again he was a pretty good kind of a fellow. He'd drink and spree around and make lots of trouble for his wife and family but then he was as kind and as good a soul as ever lived. That is, he was good when he wasn't drunk and he wasn't drunk all the time. When he was all right, when he was doing something, he was so kind and gentle that one could not think that there was any wrong in him. And he could pull the wool over the eyes of those who had known him longest. You remem'er the piece of land that he owned down here by the creek, don't you?"

"Yes, they called it the stone quarry."

"Yes, they called it the stone quarry and you would need to be told of it or you would never have known it. There was a little place dug out of the side hill, some pieces of stone laying around. And off to one side was a little knob and on that was Mike's shanty. I believe there were two rooms besides a kind of a kitchen and then there was a kind of a shed where they kept the mule and cart. Do you remember Mrs. O'Brien?"

"Well, I should say I did. I knew her when Mike first came to this country. That marriage was a surprise to me. She was a splendid looking woman when Mike married her."

"That's true, it was Mike's kindness and gentleness which fascinated her. He got her the same as he got your dollars and I don't suppose there was much difference in the effort required. I have seen her lots of times when she was looking for Mike when he was on a spree, and I have heard people hint to her that she ought to leave him, and it was then that she always looked like her old self, and she would say that there wasn't as good a man in the county as Mike despite all his faults; that there was just one thing the matter with him and who else was there for whom you could say as much. She said: 'Here are men who will lie, and cheat and do many things that are wrong and in a respectable kind of a way, but there is nobody who is as kind and good as Mike O'Brien. He never said a cross word to me and I never asked him for anything that he didn't give it to me, if he had it, and what woman in the county can say that.' As soon as she would find him he would go right home with her and she'd straighten him out and he would keep all right again for awhile. And that little girl of theirs—by-the-way, let us take a walk down toward the old quarry—that little girl of theirs; the mother's beauty is gone but it has rested here. There was no child around whose eyes were so bright or complexion so clear, and none more dainty and fine and certainly none so marvelously beautiful. As a baby everyone knew her because she was so pretty and as a very little girl she was even more attractive. Her little dresses, very simple, and cheap, yet never ragged and always clean.

She seemed out of place in the old shanty, or tagging round after Mike as he worked in the quarry, smoking a short-stemmed pipe. He was wonderfully attached to her. And she was delighted with all that he had to say and do. Her mother never allowed her long out of her sight. She was a great comfort.

People would look at this little woman and almost doubt her origin, her father carrying the marks of periodical dissipation and the attendant hard work, and her mother faded and harassed from being attached to him. I used to think about that a good deal and after a time I came to understand it. I knew that if one were to take all the good qualities that there were in Mike O'Brien, separate them from everything else that was attached to him, and go back to the early period in his life when his evil ways were not a part of him, and take him as he then stood and combine this with the refinement of his wife and her gentleness and beauty of character, that he would certainly have been a splendid being. And this I figured out was little Katie. In her birth everything disagreeable and bad and homely had been left behind. She was filtered. By the time she was eight or nine years of age you will remember that Mike died. They got along better after that. The mother was untrammeled and one way and another they managed to live. They had a piece of a farm attached to the quarry land and a couple of cows, and the mother with Katie's help managed to do some sewing and other work and they got along better than before."

The speakers had reached the vicinity of the quarry; tall masts could be seen above the tree tops, wire ropes going in all directions. They reached a railroad track. It went in the direction of the quarry.

"What does this mean?" was asked.

"You must remember that you have been away from here twelve years. Time makes a good many changes."

There was magnificent stone-channeling machinery, drills, workshops, boiler house and all the paraphernalia of a prosperous business.

"How did it all happen?"

"Well, it all happened through Katie. She was about twelve years old when you left here and about five years from that time a young man stopped at the quarry to get a drink. He came here from the city to do some hunting. One drink was not sufficient. He came back this way again in a short time and he looked into Katie's eyes as he handed her the tin-cup—she hesitated for a moment—and then walked into the house. Hunting was good around the old quarry that year. The young man's father didn't like the idea of his marrying Katie O'Brien. His name was Smith but it couldn't be helped; the affair got too good a start before he found it out. The elder Smith wouldn't let his son come home. He bought him a piece of land near the quarry and told him if he wanted to stay there with Katie it was all right, but not to bring her home. Well, that was Katie that you saw going down the street a while ago. There isn't a prettier woman in the state or a better one, and the baby is another Katie. The young man didn't do any farming. He took the little money that his father allowed him and did some quarrying and the business grew. Here it is. As things began to be more prosperous the old gentleman Smith signified his willingness to have Katie come with her husband and visit them in the city, but she didn't do it that way. She said to her husband; 'Let your father and mother come here, and then after a time we will go and see them.' They didn't come right away, but they got around after a while and the old man saw what was going on and he put a big lump of money into the quarry, and here it is. They are getting it out very fast.

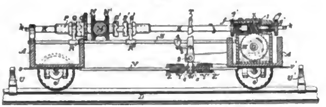
REGENT PATENTS.

[We will furnish copies of the Specifications and Drawings of any Patent for 25 cents each.]

No. 392,398—Gang-Drill Rock-Channelling Machine. Albert Ball, Claremont, N. H., assignor to the Sullivan Machine Company, of same place. Filed May 10, 1887.

This invention relates to that class of rock-channeling drills where the machine requires to be constantly fed along a track forward for a distance and then back at a slow and preferably uniform speed, while at the same time an engine works a gang of steel drills and rapidly strikes them against the rock, thereby cutting a channel; and the improvements have for their object a simple and effective method of causing these feed movements, and also of stopping and reversing by hand the movement of the machine on the track, and also, without interfering with these changes by hand, automatic stopping and reversal of the movement along the track when the desired terminal points are reached, and a simple and practical way of doing this, and, incidentally, an economical way of taking up the thrust wear of the boxes to the feed-reversing shaft.

Fig. 1.



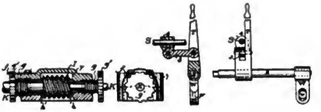
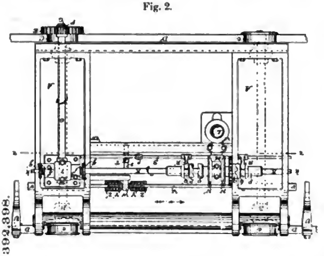


Fig. 2.



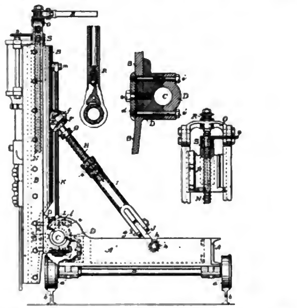
In channelling with a gang-drill, if the feed be not stopped the instant the end of the cut is reached, serious strain on the drills results. The advantage of an automatic reversal of the feed in addition to the economy of labor is therefore manifest.

No. 392,399—Gang-Drill Rock-Channelling Machine. Albert Ball, Claremont, N. H., Assignor to the Sullivan Machine Company, of same place. Filed May 10, 1887.

This invention relates to an improved method of constructing a gang-drill rock-channeling car-frame, and in connection therewith of setting and securing an adjustable engine guide-frame wherein the driving engine and drills are to work, and of moving and securing the said engine upon its said guide-frame.

The object is to have such channeling car-frame stiff and strong and as light as consistent therewith, and to have said guide-frame easily and quickly adjustable at any angle to either the plane of the cut or to the plane of the surface, to firmly secure it in such position, and to allow of the frame with contents being quickly transferred, if desired, from one end of the car-frame to the other end, to quickly feed the drive-engine with its drills down as its work progresses, and to prevent back action of the engine on the feed-screw, and this invention claims to accomplish these things satisfactorily and with simplicity and economy by the mechanism illustrated in the accompanying drawings.

In the process of channel-cutting, the engine, with its gang of drills, needs to be moved down nearer to the surface after each time crossing the quarry until a depth is reached requiring longer drills, when the engine is moved up, the new drills put on, and the process repeated. In this feeding process the inventor uses a feed-screw, N, which has a plain shouldered bearing in the top piece, O, and passes through a screw seat or nut in the engine-cylinder frame P. This screw is turned readily by a ratchet-wrench, R, of a form well known to the arts. Turning the screw one way feeds the engine up and reversing the motion feeds it down, the screw being held in its top bearing between collars.



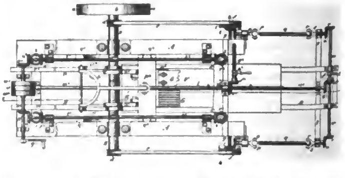
In practical operation in the severe pounding which the drills have to do great strain comes on this feed-screw, and to avoid the strain and jar in part the device has a screw-set, S, which, when the drill engine is in place, is screwed down firmly upon the screw-nut P by throwing around the lever-arm *s*. This holds the screw and engine firmly in their then position and prevents all possible play and consequent wear and jar between the two.

No. 392,601—Stone-Cutting Machine. Emanuel Foerster, New York, N. Y. Filed November 25, 1887.

The object of this invention is to provide a machine for cutting moldings, arches, and other designs on stone with rapidity and accuracy.

To cut or shape a stone by this improved machine. (See Fig. 1.) the stone-carriage E is first advanced toward the front of the machine and the pinion i^2 placed in gear with the rack h^2 and worm j^2. A stone, F, is now placed upon the carriage E, said stone being placed in proximity to the tool G. The main driving-shaft B is now started to rotate by means of the belt *a* and pulley *b*. As the shaft B rotates, the tool G, by means of the eccentric m^3, rods n^3, and sliding plate o^3, will be reciprocated rapidly. As the tool G is thus reciprocated, the carriage E, and thereby the stone F, will be advanced through the medium of the gearing marked on the drawings in alphabetical order from *d* to *w*, and the wheels b^2 and d^2, shaft n^3, worm j^2, pinion i^2, and rack h^3. By this means, as the tool G is recipro-

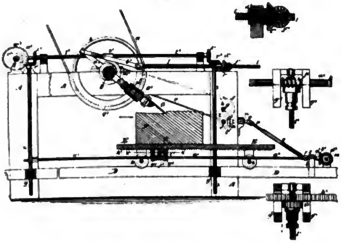
Fig. 1.



cated the stone is gradually fed to the tool until the desired outline is produced.

As the stones F may vary in thickness, the frame D, supporting the stone carriage E, is adapted to be raised and lowered. This is accomplished by means of the vertical screw-rods x. At their upper ends the rods x are provided with gear-wheels r^2, which mesh with similar wheels, s^2, on horizontal shafts t^2, supported in suitable bearing at the upper part of the frame A. The shafts t^2 also carry gear-wheels u^2, which mesh with similar gear-wheels, v^2, on a driving shaft, H, suitably journaled on the frame A. The shaft H may be driven by any suitable means, but preferably by means of fast and loose pulleys w^2 x^2, over which pass belts from any suitable motor for turning said shaft H in opposite directions. When it is desired to raise or lower the frame D but little, the shaft H may be turned if preferred, by means of a crank-handle, y^2, Fig. 1. By gradually raising or lowering one end of the frame D above the other and while the stone advances arches or other curves may be cut in the stone on this machine. To readily accomplish this, the shafts t^2 are severed and their severed ends connected by sliding sleeves z^2, grooves and feathers or other suitable connections being provided between the sleeves s^2 and shafts t^2. By moving back the sleeves z^2 the screw-rods x at one end of the frame A only will be turned, whereby only one end of the frame D will be operated. By moving the sleeves s^2, so as to connect the severed ends of the shaft t^2, both ends of the frame D will be raised or lowered in unison.

Fig. 2.

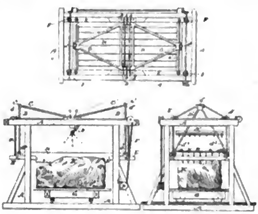


Stones, F, of different degrees of hardness should often be approached by the tool G at different angles; also when more or less stone is desired to be removed by the cut of the tool. To permit the tool G to be thus presented to the stone, these are secured to the guide-block p^2 arms or levers a^4, which preferably have their fulcrum on the shaft B. The opposite or free ends of the levers a^4 are pivotally connected by means of a forked or other shaped rod b^4 with a longitudinally-movable rod or shaft, I, as shown. The shaft I is screw-threaded toward its outer end and passes through a nut or internally-threaded tube, d^4, journaled in bearings on the frame A. The tube d^4 carries at one end a bevel gear-wheel, e^4, which meshes with a similar wheel, f^4, loosely carried by a shaft, g^4. By means of a clutch, h^4, carried by the shaft g^4, the wheel f^4 may be caused to rotate to turn the nut or tube d^4, and thereby move the shaft I. The shaft g^4 is suitably hung in the frame A, and may be revolved, when desired, by any suitable means. (Not shown.) By rotating the nut d^4, and thereby moving the shaft I either back or forward, the tool G will be raised or lowered to approach the stone at the desired angle, as before stated. When the stone F has been advanced in the direction of the arrow in Fig. 2, and the desired cut has been made nearly to the end of the stone, there may be danger, especially with soft stones, that the end portion of the stone at the cut be broken off by the tool. To prevent this and to finish the cut in the stone, the tool G is raised by moving back the shaft I. The carriage E and thereby the stone are moved to the back of the machine in the direction of the arrow, Fig. 2. The shaft I is then advanced toward the front of the machine, whereby the tool G will be swung backward and against the end of the stone that was left uncut. By now advancing the carriage and thereby the stone toward the tool G the uncut part of the stone may be finished without danger of its being broken off, as the cutting is finished from the opposite direction.

With machines of this construction perfectly flat surfaces, moldings, pillars, &c, may be cut by merely changing the cutting-tool G. These tools G may have any desired shaped cutting-edge. In Fig. 1 is shown one form of tool by which a wide and ornamental cut is made; but cutters G may be of any desired width.

No. 393,201—Machinery for Sawing Stone. John A. Bailey, Marquette, Mich., (Jane C. Bailey Administratrix of John A. Bailey, Deceased,) Assignor of one-half to John H. Jacobs, of same place. Filed March 29, 1887.

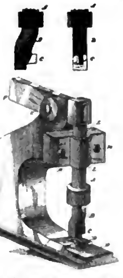
This invention relates to improvements in stone-sawing machines, and has for its object the production of a machine wherein the working parts are kept level during the length of the stroke of the saws, and wherein water and sand are admitted to the kerf and under the saws without the usual mechanical devices for "jumping" or lifting of the saws at each half-stroke to admit such water and sand.



No. 393,300.—Device for Sharpening Stone-Cutting Tools. Edward England, Duluth, Minn. Filed July 13, 1888.

This invention relates to improvements for cutting and sharpening stone-cutters' tooth-chisels, tooth-axes, &c., for gumming saws, and for punching holes in metals, &c.

To operate this device, the guide and gage having been first adjusted to regulate the size of the teeth, the edge of the chisel or other instrument to be cut or sharpened first having been heated red hot is held against the ledge of the throat-plate D, as directed by the guide, when the lever is pressed down by the foot of the operator, thus carrying the upright shaft downward, the cutter or punch doing its work. The operation is repeated as often as required, the chisel or other instrument being moved laterally until the cutting is completed.



A marble tablet recently found in an ancient sepulcher on the Via Portuensis, Rome, is apparently a work of the first century. It represents a naked youth, with long, disheveled hair, defending himself against two women, one facing him and the other attacking him from behind. The women brandish thyrsi, resembling lances, in one hand, and a serpent winds itself around the other arm of each, and they seem as if about to sling them at the face of the youth. Archæologists are puzzled to know what it is all about, but believe it represents the death of Pentheus, who was torn in pieces by Mænads on Mount Cithæron for having reviled the Bacchic mysteries.

Every man, whether employer or employe, will find a year's subscription to STONE a paying investment.

COAL MEASURES.

THE following quotation is from Hugh Miller's "Old Red Sandstone." It is perhaps the most graphic picture ever drawn of the earth during the time when coal was being formed:

"We have entered the Coal Measures. For seven formations together—from the Lower Silurian to the Upper Old Red Sandstone—our course has lain over oceans without a visible shore, though, like Columbus, in his voyage of discovery, we have now and then found a little floating weed, to indicate the approaching coast. The water is fast shallowing. Yonder passes a broken branch, with leaves still unwithered; and there floats a tuft of fern. Land, from the mast-head! land! land!—a low shore, thickly covered with vegetation. Huge trees, of wonderful form, stand far out into the water. There seemed no intervening beach. A thick hedge of reeds, tall as the masts of pinnaces, runs along the deeper bays, like water-flags at the edge of a lake. A river of vast volume comes rolling from the interior, darkening the water for leagues with its slime and mud, and bearing with it, to the open sea, reeds, and ferns, and cones of the pine, and immense floats of leaves, and now and then some bulky tree, undermined and uprooted by the current. We near the coast, and enter the opening of the stream. A scarce penetrable phalanx of reeds, that attain to the height and well nigh the bulk of forest trees, is ranged on either hand. The bright and glossy stems seem rodden like Gothic columns; the pointed leaves stand out green at every joint, tier about tier, each tier resembling a coronal wreath or an ancient crown, with the rays turned outwards; and we see a-top what may be either large spikes or catkins. What strange forms of vegetable life appear in the forest behind! Can that be a club-moss that raises its slender height for more than 50 feet from the soil? Or can these tall, palm-like trees be actually ferns, and these spreading branches mere fronds? And then these gigantic reeds!—are they not mere varieties of the common horse-tail of our bogs and morasses, magnified some sixty or a hundred times? Have we arrived at some such country as the continent visited by Gulliver, in which he found thickets of weeds and grass tall as woods of 20 years' growth, and lost himself amid a forest of corn, fifty feet in hight? The lesser vegetation of our own country, reeds, mosses and ferns, seems here as if viewed through a microscope; the dwarfs have sprung up into giants, and yet there appears to be no proportional increase in size among what are unequivocally its trees. Yonder is a group of what seems to be pines—tall and bulky, 'tis true, but neither taller nor bulkier than the pines of Norway and America; and the club-moss behind shoots up its green, hairy arms, loaded with what seems catkins above their topmost cones.

"There is an amazing luxuriance of growth all around us. Scarce can the current make way through the thickets of aquatic plants that rise thick from the muddy bottom; and though the sunshine falls bright on the upper boughs of the tangled forest beyond, not a ray penetrates the more than twilight gloom that broods over the marshy platform below. The rank steam of decaying vegetation forms a thick blue haze, that partially obscures the underwood; deadly lakes of carbonic acid gas have accumulated in the hollows; there is silence all around, uninterrupted save by the sudden splash of some reptile fish that has risen to the surface in pursuit of its prey, or when a sudden breeze stirs the hot air, and shakes the fronds of the giant ferns or the catkins, of the reeds."

Look over this issue carefully, and it will convince you that 12 as good and better numbers are worth $2.

CHALK ANALYZED.

At first sight this stone seems to have no distinct character at all. It is a soft, white, crumbling substance, soils your fingers when you touch it, and seems neither to have grains like the sandstone nor crystals like the granite. You will need to use a magnifying glass, or even perhaps a microscope, to see what the real nature of chalk is. Take a fine brush and rub off a little chalk into a glass of clear water, then shake the water gently and let it stand for a while until you see a layer of sediment on the bottom. Pour off the water, and place a little of this sediment upon a piece of glass, and look at it under the microscope or magnifying glass. You will find it to have strongly marked characters, which might be set down thus:

1. The stone, though it seems to the eye much more uniform in its texture than either sandstone or granite, is made up of particles resembling each other in color and composition, but presenting a variety of forms.

2. It consists of minute shells, pieces of coral, fragments of sponges and white particles, which are evidently the broken-down remains of shells, under a microscope which magnifies them fifty times. Large and well preserved shells, sea urchins, and remains of other sea creatures occur embedded in the chalk.

As a brief description of chalk, you might say that it is a stone formed out of the remains of once living animals.—*Manufacturer and Builder.*

STONE should speak for itself to every intelligent man in the trade, and it does so speak. Hearken unto its voice, and subscribe for 1889!

Old Mrs. Bently—I see that the bakers are making their bread lighter than they used to.

Old Mr. Bently—Yes; and the poor people are kicking like thunder.

Old Mrs. Bently—Why, I don't see why they should. To me heavy bread is an abomination.—*Epoch.*

Merchant (on collecting tour)—"Mr. Brown, can you tell me why my errand here this morning is like a well baked loaf of bread?"

"No, I cannot. Why is it?"

"Because it's 'dun Brown." Brown paid the bill.—*Kansas City Grocer.*

"My dear," said a baker's wife to her husband, "the advance we made in the price of bread is too high. We must reduce it."

"Reduce it?" exclaimed the baker. "I guess not. I reduced the weight yesterday, and there won't be two reductions in one week if I know myself."

Landlady (complainingly)—Flour is going up, Mr. Blodgers.

Star Boarder (dropping a heavy biscuit with a dull thud)—So I understand; but your bread doesn't seem to rise correspondingly, Mrs. Hashley.

Old lady (to grocer's boy)—What makes the price on them potatoes so stiff, boy?

Grocer's boys—It's because there's so much starch in 'em mum. —*Life.*

Monogram stockings are all much worn now by the women. The recent sloppy weather has led to the discovery of the interesting wrinkle.

They call it "a duck of a bonnet" because there is so much bill to it.—*Washington Post.*

CONTRACT NEWS.

The works mentioned below are of especial interest to the trades represented by this journal. The structures are of stone, or they contain stone.

LOCATION.	OWNER.	ARCHITECT.	STRUCTURE.	COST.
New York City.	Mary A Walker	H G Knapp	Flat Building	$54 000
New York City.	D Christie	R S Townsend	Flat Building	22,000
New York City.	D Christie	"	Flat Building	35,000
New York City.	John Bannon	John C Burne	Flat Building	40,000
New York City.	Patrick Canavan	Geo B Pelham	Flat Building	16,000
New York City.	Geo W Rudden	G H Schellinger	Residences	60,000
New York City.	John Totten	Geo B. Pelham	Flat Building	18 000
New York City.	The City	Geo W. Debevoise	School building	70,000
New York City.	B A & G W Williams	Thom & Wilson	Flat Building	20,000
New York City	Clinton J Warren		Apartment House	200,000
Chicago, Ill.		J A Thain	Residence	16 000
Chicago, Ill.	D Christie	R S Townsend	Three Residences	42,000
Kansas City, Mo	Mrs Alice Chouteau	Herman Probst	Four Residence	50,000
Kansas City,	James C Nettleton	James Bannon	Flat Building	20,000
Kansas City,	L Hammerslough	A B Cross	Office Building	87.000
Kansas City	J W Tullis	E P Brink	Flat Buildings	76,000
Washington, D. C.	Columbia Athletic Club		Building	35,000
Washington, D. C.	Aulick Palmer		Residences	20,000
Washington, D. C.	Washington Safe Deposit Co		Safe Deposit Building	40,000
Washington, D. C.	W K Carr		Residence	20,000
Des Moines, Iowa	Drake University	E J Ingersoll	Building	40,000
Des Moines, Iowa	State Soldiers' Monument Com		Monument	10,000
Philadelphia, Pa.		R M Braithwait & Co.	Carriage Factory	45,000
Philadelphia,	C W McGlensey	L Johnson	House	16,000
Philadelphia,	Mrs J Bonbright	"	Residence	12,000
Philadelphia,	Samuel Meyers	J F Stuckert	Business Block	
Philadelphia,	Bell Telephone Co	Addison Hutton	Office Building	75,000
Boston, Mass.		Peabody & Stearns	Business Block	1,000,000
Boston, Mass.	The City	C J Bateman	Engine House	40,000
Arkansas City, Ark.	A A Newman		Residence	20,000
Arkansas City, Ark.	" " "	Wm Gall	Residence	20,000
Brooklyn, N. Y.	Armour Packing Co	A W Black	Building	10,000
Lima, O.	First Congregational Church	Plans wanted	Church	20,000
Cleveland, O.	Board of Education	Wm Dunn	School-house	38,000
Detroit, Mich.	Ellen Hammond	James W Carpenter	Tomb	10,000
Alexandria, Ky.		A Drulding, Chicago	Church	17,000
West Brothertown, Wis.		" "	Church	10,500
Malden, Mass.			Depot	40,000
Lock Haven, Pa.	State Normal School		School-house	125,000
Fort Washington, Pa.	J M Kennedy Jr.	M H Culver	Residence	10,000
Lowell, Mass.	The City	Plans wanted	Soldiers' Memorial Bldg.	
Burlington, Ia.	So. Burlington M. E. Church	I N Ripley	Church	20,000
Detroit, Mich.	Unitarian Church Society	Plans wanted	Church	75,000
Memphis, Tenn.	The Tennessee Club	"	Building	40,000
St. Joseph, Mo.	The City	Eckel & Mann	Jail & Sherriff's Residence	85,000
Canton, O.		Guy Tilden	Infirmary	159,000
Findlay, O.	Memorial Hospital Ass'n.	Prof J W Zeller	Hospital	25,000
Pueblo, Colo.	Ancient Order of United Workmen		Building	50,000
Denver, Colo.	Turn Verein Society	Conrad Wallbrach	Building	75,000
Sea Isle City, N. J.	John F Betz & Son	Wm Gette, Philadelphia	Hotel	12,000
Los Angeles, Cal.	Long Beach Developement Co		Hotel	100,000
Miller, Dak.		T D Allen, Minneapolis	Court House	8,000
Lake, Ill.	The City		Police Station	17,000
West Bend, Wis.		Joseph Ott	Court House	30.000
Akron, Colo.	County Com.		Court House	10,000
Cincinnati, O.	G & A Brink	Herman Lachman	Warehouse	15,000
Albany, N. Y.	B W Wooster Son's		Store Building	60,000
North Denver, Colo.	Tallmadge & Boyer		Terrace	90,000
Sioux City, Iowa.		Architect Loft	Stonefront Tenement Bldg	9,000
Palatka, Fla.	The City		School-house	15,000
Greenville, Tex.	M K & T R R Co., St. Louis, Mo.		Depot	10,000
Louisville, Ky.	St Andrew's Protestant Episcopal Ch	Rev. Dr. Pennick	Church	50,000
Du Quoin, Ill.	Catholic Church Society	Plans wanted	Church	20,000
Columbia, Mo.	Christian Church Society		Theological School	50,000
Bridgeton, N. J.		D. P. Mulford	Church	20,000
La Fayette, Ind.	The City	James F Alexander	High-school & Library Bg	30,000
Plattsmouth, Neb.	The Presbyterians		Church	15,000
Alameda, Cal.			School-house	20,000
Spokane Falls, Wash. Ter.	The Society of Jesus		College	100,000
Nebraska City	The City		School House	16,000
Pipestone, Minn.		Judge Perkins	Opera House	30,000
Hamberg, Pa.		Rev. R S Appel	School House	23,000
Wichita, Kan.	Francis Whittaker & Sons	John Thomas	Building	250,000
Lima, O.	Goldsmith & Kuhn		Hotel	35,000
Toronto, Can.	West End Christian Temperance So		Hall Building	20,000
Allentown, Pa.	Y M C A		Building	10,000
Madison, Wis.	" " " "		Building	50,000
Syracuse, N. Y.	Liederkranz Society		Hall	20,000
Ballston Spa, N. Y.	The City	M F Cummings	Court House and Jail	30,000
Fort Scott, Tex.	Bourbon County		Court House	75,000

PRICE CURRENT.

BLUESTONE.

(Lord & Griswold, Chicago.)

New York	45c
Wyoming Valley	45c

BLUE FLAG STONE—

(J. G. Barger, Goodyear's, Cayuga Co., N. Y.)

Prices f. o. b. Atwater, on L. V. R. R. and Cayuga Lake.

Rough and Wavy Flag.	Sq. ft.
2, 3 and 4-ft. size	5c
5 and 6 "	6c
Split Flagging.	
2 and 3-ft. size	6c
4 "	7c
5 and 6 "	8c
Smooth Split Flagging.	
2 and 3-ft. size	8c
4 "	9c
5 "	10c
6 and 7 "	11c
Solid Rock, per cubic foot	50c
Platforms, 4 in. thick.	Sq. ft.
Less than 25 sq. ft.	16c
25 and less than 40 sq. ft.	20c
40 " 50 "	25c
50 " 60 "	30c

Platforms containing more than 60 sq. ft. prices given on application. For platforms more than 4 in. thick, add 6c per inch for every inch over 4 inches up to 8 inches; over 8 inches thick prices given on application. Special advantages for furnishing large platforms.

For planing and jointing, per sq. ft.	25c
For planing, jointing and beading, per sq. ft.	30c

[Forest City Stone Co., Cleveland, O.]

(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	20
Gutter stone, 4 to 8 inches,	20
	Sup. ft.
Flagging—	
4 to 6 inches thick, natural bed, any size up to 12 ft. long	12c

EUCLID BLUE AND COLUMBIA SANDSTONE—

Sawed Flagging.	
1 in. thick	10c
2 "	10c
2½ "	13c
3 "	14c
4 "	18c

BROWNSTONE—	cu. ft.
Ohio—No. 1 Promiscuous blocks	60c
No. 2 " "	50c
Ashland Wis.—Promiscuous blocks	60c
Connecticut—No. 1 " "	95c
No 1 " "	85c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	40
No. 2. " "	30c
No 1. Monument Bases, broken to size	45c
No. 2. " " " "	35
Engine beds, broken to size,	40
Perch of Wall Stone, per ton railroad weight	50c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$1 00
Special sizes, per cubic foot	60

NORTH RIVER BLUESTONE—

(Union Bluestone Co., New York.)

Flagging	
Rough Flag, promiscuous sizes	$ 9
Smooth " " "	10
2 and 2.6 Smooth Flag, 1½ in. and over	12
3 " 3.6 " under 1½ in. thick	11
3 " 3.6 " 1½ in. and over	13
Cess-Pool Flag, 2 to 2.2 in. square, 3 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1¼ and under 1¾ in. 2 ft. and over wide, wide	13
4 and 4.6 in. smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in.	23
5 ft. " " 3 in.	25
5 and 5.6 Smooth Flag, 2 in. and over	17
5 and 5.6 " " under 2 in.	15
6 and 6.6 " " 2 in. and over 18	18
6 and 6.6 " " under 2 in.	16
Well Stone, 3 to 3½ in. thick, 4 to 4.6 in. square	24
Well Stone 3 to 3½ " 5 to 5.6 "	29

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag.	
6 ft. to 6.6, x 5 to 6 ft. wide	$ 22
7 ft. to 7.6, x 4 to 6 ft. "	24
8 ft. to 8.6, x 4 to 6 ft. "	26

The above to be 2½ inches thick.

Promiscuous Large Flag.	
30 to 50 ft. 3 in. thick	28
50 to 70 "	35
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thickness at special prices.

For planing add 22 cents.

For rubbing add 35 cents.

Window Sills and Lintels.	
3 x 8 in. Quarry cut	22
4 x 8 in. " "	24
5 x 8 in. " "	29

½ in. allowance in thickness

Door Sills.

5 x 18 in. Quarry cut 5 x 11 in. " " 5 x 18 in. " "	3½ cts. per in. in width

8 to 10 ft. long, add 10 cts. per foot.

Curb, Quarry Cut.	
Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in. thick	27
14 " under 4 in. "	28
14 " 4 in.	32
16 " bev'd, under 3½, 3 ft. and over, long	31
16 in. Curb, 3½ to 4, 4 ft. and over, long	33
18 " 3½ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	55
16 in. Corners, per set	5 50
20 " "	6 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.	
12 in. gutter, 3 to 3½ in.	17
12 in. " thin	14
14 in. " 3 to 3½ in. 3 ft. and over, long	20
14 in. " thin, 2.6 and over, long	18
16 in. Belgian Bridge, 4 in. thick	44
20 in. " " 4 in. thick	55
24 in. " " 4 to 4½ in.	65
24 in. " " 5 to 6 in.	77
24 in. " " 7 to 8 in.	90
19 in. Bridge Flag Joints, 3½ in.	28
20 in. " " " 3½ in.	40
24 in. " " " 4 in.	50
Coping	
11 in. Coping, 2 to 3 in.	23
14 " 2½ to 3 in.	29
16 " 2½ and under 3½ in.	40
16 " 3½ to 4 in.	45
18 " 3½ to 4 in.	50

20 in. to 36 in. Coping, 4 in. thick, 3½ cents per in. in width. When ordered over 4 in. thick, special price will be given.

When ordered under 4 in. thick, 3 cents per in. in width.

Steps.	
6 x 12 in. promiscuous lengths, under 8 ft.	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft. and up to 10 ft. long, add 10 cents per foot.

Rock.	
Promiscuous Rock, per in. in thickness	6
Dimension Rock, per in. in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 Inches Thick	
Under 20 feet	30
20 feet and under 35 feet	35
35 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price

Above, if dimension both ways, add 10 per cent.

For 5 in.	add	10 cts.
" 6	"	20
" 7	"	30
" 8	"	40
" 9	"	55
" 10	"	65
" 12	"	100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.	
4x8 in.	42
5x8 in.	50
5x9 in.	60
5x12 in.	77

½ in. allowance in thickness.

Rubbed Lintels.	
3½ to 4 x 10½ in. under 8 ft.	48
8 ft. and under 10 ft.	60
4 in. x 13 in. under 8 ft. in length.	67
Rubbed Curb.	
2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in.	48
12 " " " 4 in.	55
Rubbed Mantels	
4 x 10 in.	56
4 x 12 in.	65
4 x 14 in.	75

Dimension lengths with heads, measure heads.

Rubbed Hearths.	
3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4.6 in. long, 1.4 to 2 ft. wide	33
" 4.6 to 5.6 " 1.4 to 2.6 in. wide	40
" 5.6 to 6.6 " 1.4 to 3 ft. wide	45
" 6.6 and under 8 ft long, 2 to 4 ft. wide	65
Rubbed and Jointed Tile.—Boxed.	
Under 2½ in. thick, 12 to 30 in. square, per superficial ft.	56

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.	
3 ft. and 3 ft. 6 in., 1 ft. 6 in. and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 5 " 6 " 2 " "	39
6 " 6 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cemetery and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

Trade discounts on application.

BROWNSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, unless otherwise mentioned.]

	Cu. ft.	
Carbondale, light	70c.	f. o. b. quarry
" dark	95	" "
Hummelstown	45	" "
Lake Superior { Marquette	1 00	" Chicago
Lake Superior { Rain Drop	1 00	" "
Trenton	50	
Liodeo	50	
New Brunswick	45	
Kibbie—Massachusetts	65	

OHIO BROWNSTONE—

	Cu. ft.
Killbuck	45c
Gann	45c
No 1. Promiscuous blocks	45c
No. 2. " "	30

Stone ordered in dimension sizes 12 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT BROWNSTONE—

(Middlesex Quarry Co., Portland.)

	Cu. ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft. and over, price to be agreed upon.	
	Superficial
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft long, promiscuous sizes	63
Platforms, Cornice, etc., 7 to 9 in. thick, under 18 superficial feet	85
Platform, Cornice, etc., 18 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	1 12
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashler, under 4 in. thick	20
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 6 in. promiscuous lengths	63
Steps Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu. ft.	1 50
" " 20 cu. ft. and over, price to be agreed upon.	
Monumental Stone, 8 to 12 in. thick, charged 12 in.	
Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in. thick	58

Discount 5 per cent.; cash or approved Notes, at two months.

FREESTONE.

(Lord & Griswold, Chicago.)

New Brunswick brown	45c
Buena Vista	40
Ohio	30
Long meadow, brown	60

GRANITE.

(Lord & Griswold, Chicago.)

Westerly	
Monson	65c
Woodstock	65c
Mica Stone	50c
Port Deposit	65c

GREEN STONE.

(Lord & Griswold, Chicago.)

Pennsylvania	50c

LIME, CEMENT, ETC.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs.	$ 28
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	50
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " 1 " " " "	
Fire brick Savage per 100	
" " Aetna " "	4
" " Montezuma " "	3 50
" " West Virginia " "	3 00
Ground fire clay, best, per bushel	1 00
" " " common " "	

Discounts

Vitrified sewer pipe,	50 per cent.
Flue Pipe, for Chimneys	25 " "
Terra Cotta Chimney Tops	25

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.65 per ton, f.o.b. Erie.

LIMESTONE.

(Lord & Griswold, Chicago.)

	Cu. ft.
Salem, Bedford	25c f. o. b. quarry.
Oolitic, " buff	25 " "
" " blue	35 " "
Oolitic Bowling Green	28 " "
Artesian	35 " "
Grafton	35 " "

MAGNESIAN—

(J. A. Green, Stone City Iowa)

Dimension Stone —(First Quality of all ordinary sizes.)	
12 inches and over, per cubic foot	$ 35
11 to 12 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17
Vault covers—(Large size.)	
7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25
Flagging Stone—(Ordinary size)	
5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10
Bridge Stone.	
Common, per cubic yard	$ 2 50
Copplngs, " " "	6 75
Pedestal Bases, per cubic yard	5 75
Footing Stone.	
Dimensions, per cubic yard	$ 6 25
Common, " " "	2 60
Rubble or Building Stone.	
Common Rubble, Per 100 lbs	2½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	5
Street Crossings.	
5 to 6 inches, per superficial foot	$ 15
Curbing, 5 to 6 inches thick, per superfical ft	15
Cut and Rubbed Stone—(Finished Ready to lay in their place.)	
Ashlars per sq. ft measuring all that shows	$ 60
Base	70
Corner Blocks	
Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places

(Lord & Griswold, Chicago.)

JOLIET	Rubble, $4 cord; dimension 30c
Placed sidewalk, Chicago	64c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30		65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts, per superficial foot extra.

Rough Stone.

Mill Blocks as quarried, per cu ft	25c
Dimension Mill Blocks, per cu. ft	30
Monument and Headstone Bases, per cu. ft	35
Extra Clear Stone for Statuary, etc	60
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft	15c
Promiscuous good select Bridge Stone, cu ft	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 5 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 3 per ct, on rough and dimension, and 5 per ct on sawed

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	15
3 " " " "	15

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	22
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.	
10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing.	
10 to 12 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone,	
$3 to $4.50	per cubic yard.
Rip-Rap.	
$1 to $2.50	per car load.

MARBLE.

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental
Statuary	90	1 18	Same as 2 inch	1 35	2 00	2 70	8 50
No. 1	75	90		1 10	1 65	2 20	6 00
Average	60	70		75	1 12	1 50	5 25
No. 2	40	45		65	72	1 10	4 25
Rutland Italian	30	35		65	82	1 10	4 25
Mottled Smith	......	......		40	60	80	3 50
Best No. 3	27	32		35	52	70	3 00
No. 3	18	22		25	37	50	2 00
Extra dark and mottled blue	40	50		60	90	1 20	4 50
Dark blue	30	35		50	75	1 00	3 50
Light blue	20	25		30	45	60	3 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in Inches.	Diam. Bowl in Inches	Rutland Average. B. F. D. M. V. Mount Dk. No. 1	R'l'd No. 3 ex. dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No. 2	Rutland Best No. 3 Sutherland Falls No. 2 M. Dk. No. 3.	Rutland No. 3. Rutland Light Blue Suth'l'd F. Best No. 3	Italian.
7	4	2 75	2 65	2 55	2 45	2 35	3 40
8	5	2 95	2 85	2 75	2 65	2 55	3 65
9	5	3 15	3 05	2 95	2 85	2 75	3 75
10	5	3 35	3 25	3 15	3 05	2 95	3 90
10	6	3 60	3 50	3 40	3 30	3 20	4 45
12	6	4 30	4 10	3 90	3 70	3 60	5 20
13	6	4 50	4 30	4 10	3 90	3 70	5 50
14	6	4 80	4 50	4 20	4 00	3 80	5 70
12	7	5 15	4 85	4 55	4 35	4 15	5 75
13	7	5 35	5 05	4 75	4 55	4 35	6 25
14	7	5 65	5 25	4 95	4 65	4 45	6 50
15	7	5 85	5 45	5 15	4 85	4 65	6 75
16	7	6 05	5 65	5 35	5 05	4 85	7 00
14	8	7 10	6 60	6 20	5 80	5 60	7 65
15	8	7 40	6 80	6 40	5 90	5 70	7 90
16	8	7 60	7 00	6 60	6 10	5 80	8 40
18	8	8 00	7 40	6 90	6 40	6 00	8 90
16	9	8 80	8 10	7 50	7 00	6 60	9 60
17	9	9 20	8 40	7 70	7 20	6 70	10 25
18	9	9 50	8 70	8 00	7 50	7 00	11 00
20	9	10 20	9 30	8 60	7 90	7 40	11 50
18	10	11 35	10 35	9 45	8 75	8 15	12 75
20	10	12 15	11 05	10 15	9 35	8 65	13 75
22	10	12 95	11 75	10 75	9 85	9 25	14 25
24	10	13 75	12 45	11 35	10 35	9 85	15 75
18	11	13 75	12 65	11 55	10 65	9 95	15 65
20	11	14 55	13 25	12 15	11 15	10 35	15 85
22	11	15 35	13 95	12 75	11 65	10 85	16 85
24	11	16 25	14 65	13 35	12 15	11 25	17 85
18	12	15 85	14 45	13 25	12 15	11 45	16 95
20	12	16 85	15 25	13 95	12 75	11 85	17 95
22	12	17 75	16 05	14 65	13 25	12 25	18 95
24	12	18 75	16 85	15 25	13 85	12 75	19 95
26	12	19 65	17 65	15 95	14 35	13 15	......
28	12	20 65	18 45	16 65	14 95	13 65	......
24	13	21 20	19 00	17 10	15 50	14 20	......
26	13	22 50	20 10	18 00	16 20	14 80	......
28	13	23 80	21 20	19 00	17 10	15 60	......
30	13	25 00	22 40	19 90	17 90	16 30	......
24	14	25 80	23 20	21 00	19 10	17 00	......
26	14	27 40	24 70	22 30	20 30	18 70	......
28	14	29 20	26 20	23 00	21 40	19 70	......
30	14	30 90	27 70	24 90	22 50	20 70	......
32	14	32 70	29 20	26 20	23 70	21 80	......

Hearths, 1 in., sawed edges, per sup. foot	$ 24
No. 3 Base stripe and posts, cubic foot	1 90
Inferior No. 3 posts and stripe "	1 65
" No 3 bottom bases "	1 65
" No. blue posts, stripe and bottom bases	3 15
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " " 4 "	1 00
Footstones, 5 to 8 in., each	30
" sawed heads, each	32
" " sand rub and box	38

SUTHERLAND FALLS MARBLE—

1888	Superficial.						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental.
Mourning veins	55	66	87	92	1 28	1 64	5 40
No. 1	46	56	82	87	1 24	1 74	4 90
Average	35	49	62	67	1 01	1 36	3 90
No 2	28	34	44	47	70	94	3 15
Best No 3	23	29	35	37	56	64	2 65
No. 3	21	26	32	32	47	74	2 40

No. 3 Base Stripe and Posts, per cubic ft	$1 90
Inferior No. 3, Posts and Stripe, per cubic foot	1 65
Inferior No. 3 Bottom Bases	1 65
Markers 12 to 14 in. long, 3 inches thick each	50
do 13 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30
Footstones, 5 to 8 inches wide, 2 inches thick each	30
Footstones, sawed heads, each	32
Footstones, sawed heads, sand rub, and box, each	38
Hearths, 1 inch, sawed edges, per sup ft	24

ITALIAN MARBLE—

	Cu. ft.
Monumental stock	$4 75
Slabs over 2 in. thick, full size of block	4 25
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size.
¾ in slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubic foot.

MOUNTAIN DARK MARBLE—

1888	Superficial.					Cu.
	¾ in.	1¼ in.	2 in.	3 in.	4 in.	Monumental.
No 1	53	74	1 07	1 60	2 14	5 90
Average	45	64	87	1 30	1 74	4 90
No 2	37	49	67	1 00	1 34	3 90
No. 3	25	34	52	78	1 04	2 90

Inferior No. 3, Bottom Bases, per cu. ft	$2 15
Inferior No 3, Stripe and Posts, per cu. ft	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	50
do 10 to 14 " " 4 " " "	70
do 16 to 18 " " 3 " " "	1 00
do 16 to 18 " " 4 " " "	1 30

SPECIALS—

Diminished Dies, extra ......per cubic foot	50c
Stripe ordered 7 ft. long and over, extra per cubic foot	40
Sawing edges slabs, 1 inch thick per superficial ft	03
" " " 2 " " "	05
" " " 3 " " "	08
" " " 4 " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock ......per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths......per surface foot rubbed	05

POLISHING MATERIALS—

California Putty	per lb.	$1 00
Putty, extra fine quality	"	60
" " " " 12½ lb. boxes	"	50
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	10
" " " small lots,		15
Sponges	per lb.	75
Red Grit	"	05
Nova Scotia Blue Grit	"	05
Common Coarse Grit	"	01
Oxalic Acid	"	20
Sand	per bbl.	1 00
Cloth, 52 in. wide	per yd.	6 00

TOOLS—

¼ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	33
Frosting Tools	per doz.	3 00
⅝ in. Granite Lettering Tools	"	2 50
¾ " " " "	"	3 00
Bush Hammers	from $4 00 to	$6 00
Mash "	" 2 00 to	3 00
Toothed Axes	each	3 00
Crandalls	"	2 50
Drill Stock, Nickel Spool	"	6 00
" Brass "	"	5 00
" Iron "	"	4 00
Steel Bows and Wire Spring	"	2 00
Bitts	per doz.	2 75

BEST HICKORY MALLETS—

2 to 3 lb	each,	$ 50
3 to 5 lb	"	75
5 to 1 lb	"	1 25
5 lb. and up	"	1 50

Discounts—

Settlements are required within 30 days from date of invoice—by cash less 2 per cent.—or by bank note in full at 3 months, with exchange on New York in either case; otherwise bills will be treated as due from date of invoice and subject to sight draft.

A discount of 5 per cent. will be given on car load lots of 34,000 pounds or more in one order.

Branches of Vermont Marble Co. see price list.

Toledo	40c.
Cleveland	35
Boston	50
Philadelphia	45
Detroit	40
Chicago	50
St. Louis	60

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial in. ¾	1	1¼	1½	2	3	4	Monumental.
Dark Veined Blue	25	30	35	40	50	75	1 00	3 50
Dark Mottled Blue	30	35	40	55	55	82	1 10	4 00
Ex. Dk. Veined Blue	35	40	50	60	60	90	1 20	4 50
Ex. Dk. Mottled Blue	40	45	55	70	70	1 05	1 40	5 00

Dark blue base stripe and posts, per cubic foot	$1 75
Dark blue bottom bases ... per cubic foot	1 72
Dark blue bottom bases defective, per cubic foot	1 25
Dark blue markers, 0 10 to 1.2 long, 2 in. thick each	50
Dark blue markers, 0.10 to 1,2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 8 in wide, assorted sizes each.	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra ... cubic foot	50
Stripe ordered 7 0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing ... per cubic foot.	25
Boxing ... " "	25

(Lord & Griswold, Chicago.)

Tennessee Red	$2 50@$3 30	f. o. b.	Chicago
" Knoxville	3 00	"	"
Vermont White	2 50@ 8 00	"	"
Ophite	4 50@ 5 00	"	"
Armodite	1 50	"	"

GEORGIA MARBLE—

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$6 50	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	2 72	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 60
Cherokee, average	2 75	3 10
No. 2 base Strips and Posts.	1 50	1 95
Inferior No. 2 Posts and stripe	1 25	1 70
Inferior No. 2 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 2 inches thick, each	75	65
Markers, 12 to 12 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	25	35
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	26
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	50
Stripe ordered, 8 feet long or over, extra	50	50

Urn list, sent on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

Extra dark veined	$4 50
Dark blue	3 50

MACHINERY.

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting, Capacity.	Changes of speed.	Price.
1	4½ inches	18 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20	25.00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 24x40, fan 14 in. without water tank	$50.00
" 0	" " " " with "	54.00
" 1	" 21x27, " 10 with hood	40.00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 3,	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Steel "Hercules"	42½ per ct.
Steel	42½ "
Gal. Iron	35 "
Iron	35 "
Wire Rope Blocks	25 "

(Washburn & Moen M'f'g. Co.)

Iron	35
Steel	42½
Gal. Iron	35

BLOCKS AND TACKLE—

(Boston & Lockport Block Co., Boston.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron-bushed	2 40	4 30	2 30
10 " "	3 30	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	2 72	10 50	14 00
16 " "	9 00	18 50	24 00
18 " "	15 00	29 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	35 00	46 00
20 " "	25 00	45 00	60 00
Steel Tackle Blocks	Single	Double	Triple
6 inch	1 26	2 25	2 40
8 "	1 90	2 20	5 00
12 "	4 00	7 00	9 00
14 "	5 00	8 50	12 00

Iron-bushed, discount 20 per cent.; self-adjusting roller-bushed discount 20 per cent.

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	33 00

RED SANDSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	60c
Dunreith, red	50c
" variegated	35c
Darlington	40
McArthur	65
Carlisle	65
Potomac	50

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft.
No. 1 Promiscuous block	50c
No. 2 " "	40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	40c
No. 2 " "	30
No. 1 Monument Bases, broken to size	45
No. 2 " " " "	35
Pier Blocks " "	30

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 8 feet long and under	07c
4 " " 6 " "	09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	25c
6 " " "	46
9 " " "	68
12 " " "	88
3 in. Berea or Blue Amherst	21
8 " " "	41
12 " " "	77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	10
2½ " "	12
3 " "	14
4 " "	12

SPLIT PLATFORMS—

	Superficial feet. 5in.	12 in.
No. 1 Buff Amherst	25c	60c
No. 2 " "	20c	50
No. 1 Berea or Blue Amherst,	20c	50
No. 2 " " "	17c	40
No. 3 " " " (for sidewalks)	12½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—

	Cu. ft.
Promiscuous Blocks	15c

Write for discounts, etc.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—

	Cu. ft.
No. 1	30c
No. 2	25

(French Fort Quarry, New Castle, N. E.)

Olive ... 40c f. o b.

(Babbitt Sandstone Co., Ypsilanti, Mich.)

Brown Sandstone ... 25 f. o. b. quarry

(Lake Huron Stone Co., Detroit, Mich.)

Blue Sandstone ... 20c f. o. b

SLATE.

[Henry Fulmer, Easton, Pa.]
F. O. B. Slatington, Pa.

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft.
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 12 cents square foot in car lots.

ROOFING SLATE—

Size.	No. in sq.	
14x24	98	$3 50
13x24	106	
12x24	115	
12x22	127	
11x22	138	
11x20	155	
10x20	170	

Size.	No. in sq.	
10x18	192	$3 75
9x18	214	
10x16	222	
9x16	247	
8x16	277	
10x14	262	
8x14	328	
7x14	372	
8x12	400	
7x12	456	
6x12	534	

[Coolman & Westcott Fairhaven Vt.,]

Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17
For rubbing both faces of above, excepting caps and trusses extra	02
Any of the above unrubbed less	01
Steps, to 5 ft. in length	20
Steps, 2 ft. to 8 ft, "	25
Steps larger	special
Platforms to 16 sup. ft.	20
" 16 to 22 " "	25
" 22 to 28 " "	30
" Larger	special

Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscoting, sup ft.	20
Black Boards, ⅜ to ½ up to 2 ft. wide, crated sup. ft.	18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft	20
Black Boards, 3½ ft. to 4 ft. wide crated, " "	22
Thresholds to 5 ft in length " "	20
" 2 ft. to 8 ft. " " "	25
Curriers' Slabs, faced one side crated, " "	30
Curriers' Slabs, faced two sides, crated, " "	34
Billiard Table Beds, crated, " "	22
Imposing Stones, " "	30
Grave Covers, sawn and planed only, and in two or more pieces. " "	14
Grave Boxes, rabbeted ends, " "	20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	18
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	20
16 to 22 " "	25
22 to 28 " "	30

Vermont Red	$13 50	f. o. b.	Chicago.
" Purple	5 50	"	"
" Green	2 50	"	"

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x15, 15x20	2 65	"
8x16, 9x16, 10x16, 12x18, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b.	Chicago.
Peach Bottom		"	"
Pennsylvania	5 75@6 75	"	"
Maine	5 50@5 90	"	"

BLACK—

(Michigan Slate Co., Lansing.)

Michigan ... $5 50 f. o. b. quarry

PURPLE ROOFING SLATE.—

(Hazard Slate Company Fair Haven, Vt.)

	First.	Second
24x12	$3 75	$2
22x14	2 75	2
22x12	2 50	2 5
22x14	2 85	2 25
20x12	2 85	2 25
20x10	2 86	2 25
18x12	2 50	2 35
18x10	3 50	2 25
18x 9	2 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	2 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	2 75	2 25
14x 9	2 75	2 22
14x 8	2 75	2 25
12x10	2 50	2 25
12x 9	2 50	2 25
12x 8	2 50	2 25

A FARMER'S GOOD LUCK.

The Atlanta *Constitution* tells of the unexpected good fortune of a hard-working farmer in northern Georgia, Dickey by name. He worked a farm that his father before him had worked, getting barely a living out of its thin soil. A few months ago some Chicago men who are developing the marble interests of north Georgia struck the old Dickey farm. They prodded into its crevice and gullies while there. They told Mr. Dickey that his farm was better than a gold mine. They found on it the best marble to be found in America. Result, a lease for one hundred years from Mr. Dickey on a royalty on every square foot of marble quarried that is guaranteed to reach $1,000 every month and not to exceed $5,000 a mouth. Mr. Dickey has no expense, no work. He simply receipts every month for a minimum of $1,000 royalty. This income of $12,000 a year is guaranteed for one hundred years. So the old farm makes Mr. Dickey and his heirs rich for generations.

The Vermont Marble Company at Proctor, Vt., takes out a general or blanket policy of accident insurance for all its employes in an insurance liability company, so that if one of them gets injured or disabled he has a weekly stipend during his disability, and in case of fatal injury, his family gets several thousand dollars life insurance.

For the convenience of its employes the Vermont Marble Company at Proctor, Vt., has decided to establish a savings department in connection with its main office in that town.

Sheldon & Sons of West Rutland, Vt., marble men, have a contract to get out for the Government, 20,000 soldiers' gravestones. They make 250 a day.

SPECIAL NOTICES.

"For Sale" ads. will be inserted at the low rate of one cent a word, each time. Terms, cash with order.

Dealers wanting workmen, or workmen wanting situations, are requested to avail themselves of our columns to make their wants known. There will be no charge made for the service.

WANTED—Traveling salesman for Wholesale and Importing House. Address, stating experience, WHOLESALE, care STONE.

WANTED—A position as traveling salesman with a wholesale marble, stone or granite house. Am a practical man in the business, and have traveled extensively. During past three years have been soliciting for retailers. Address JOHN G. BLAMPIED, 21 Chestnut street, N. Y.

GOVERNMENT PROAPOSLS.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C. until 2 o'clock P. M., on the 12th day of January 1889, for the labor and materials required in the erection and completion of the excavation, and pile and concrete foundations of the U. S. postoffice, court house, etc., building at CHARLESTON, S. C., in accordance with the specification and drawings, copies of which may be seen at this office, the office of the Superintendent, Builders' and Dealers' Exchange, Charleston S. C., Builders' Exchange, Baltimore, Md., Mechanics', Dealers' and Lumbermens' Exchange, New Orleans, La., Master Builders' Exchange, Philadelphia, Pa., Virginia Mechanics' Institute, Richmond, Va., and Builders' and Traders' Exchange, Louisville, Ky.

Each bid must be accompanied by a certified check for $100.

The Supervising Architect will furnish a limited number of copies of the specification and drawings at one dollar a set, upon receipt of that sum in postoffice money order drawn to the order of the Treasurer of the United States.

WILL A. FRERET,
Supervising Architect.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 10th day of January 1889, for the labor and materials required in the erection and completion of the general and trench excavation, concrete foundation, basement and area walls of the court house, postoffice, etc., at Detroit, Michigan, in accordance with the specification and drawings, copies of which may be seen at this office, the office of the Superintendent, Builders' and Traders' Exchange, Chicago, Ill., Louisville, Ky., Builders' Association Exchange, Buffalo, N. Y., Builders' Exchange, Cincinnati, Ohio, Indianapolis, Ind., and Detroit, Mich., Builders' and Dealers' Exchange Co., Cleveland, Ohio.

The Supervising Architect will furnish a limited number of copies of the specification and drawings at three dollars a set upon receipt of that sum in postoffice order drawn to the order of Treasurer of the United States.

Each bid must be accompanied by a certified check for $500.
December 26, 1889.

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OFFICE OF

The State Soldiers' and Sailors' Monument Commission.

Indianapolis, Ind., Dec. 21, 1888.

Sealed proposals will be received at this office until 2 o'clock, p. m., on Wednesday the 30th day of January, 1889, for supplying all materials and building the superstructure, terrace and approaches of the State Soldiers' and Sailors' Monument, upon foundations already erected, in Circle Park, Indianapolis, Ind., in accordance with the specifications, plans and drawings to be seen at this office on and after Jan. 2, 1889, and in the office of the Builders' and Traders' Exchange, Chicago, Ill., Louisville, Ky., St. Louis, Mo., Kansas City, Mo.; Builders' Exchange, Cincinnati, O., Detroit, Mich., Baltimore, Md., Washington, D. C., Philadelphia, Pa.; Mechanics' and Traders' Exchange, New York, N. Y.; Builders' and Dealers' Exchange, Cleveland, O.

The successful bidder will be required to furnish a bond of $40,000 for the faithful performance of the work, and each bid must be accompanied by the names of at least three sureties, whose pecuniary responsibility must be satisfactory to the Board of Commissioners. Each bid must also be accompanied by a certified check for $1,500, drawn to the order of the Treasurer of Indiana, which the bidder agrees to forfeit to the state without legal process in the event of his failure or refusal to enter into contract with the Board of Commissioners within ten days from the time of the award, should his proposal be accepted. If he closes the contract the check will be at once returned, as will the checks of the unsuccessful bidders, after the award has been made. A failure to enter into contract within the time specified will forfeit the right to the award under this notice.

Proposals must be indorsed "Proposals for the State Soldiers' and Sailors' Monument," and addressed to the "Board of Commissioners, State Soldiers' and Sailors' Monument, Indianapolis, Indiana."

Blank forms for proposals will be furnished bidders on application to the secretary, and it is preferred that they be used. Copies of the specifications and blank contracts and bonds will also be furnished.

The successful bidder must be prepared to furnish samples from two or more of the oolitic stone quarries of the state, between which the commissioners may choose.

The right to reject any and all bids, and to choose between bidders, is reserved.

It is expected that all plans and drawings will be returned to the board on or before the day set for the award.

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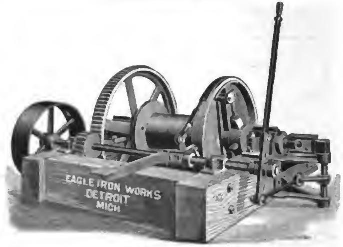

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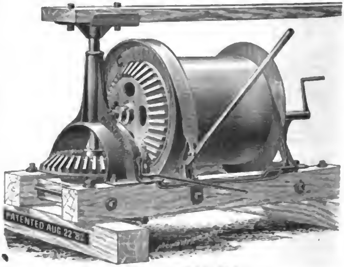

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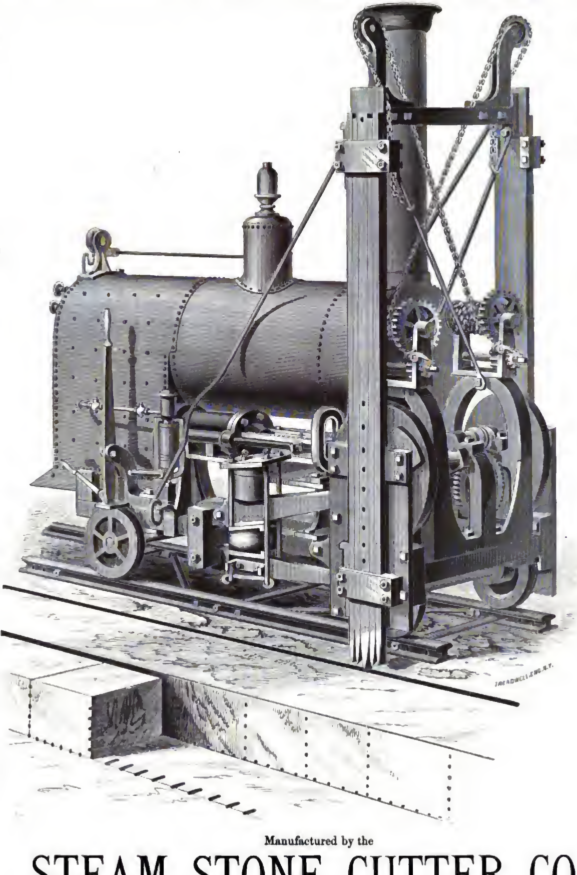

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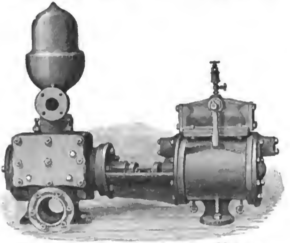

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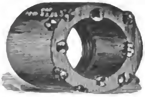

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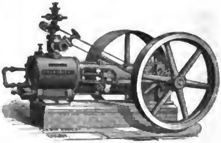

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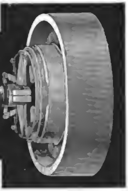

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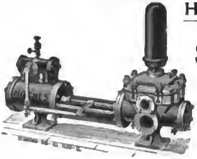

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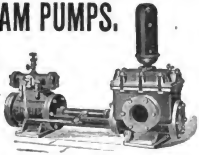

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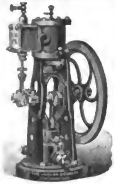

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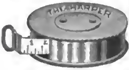

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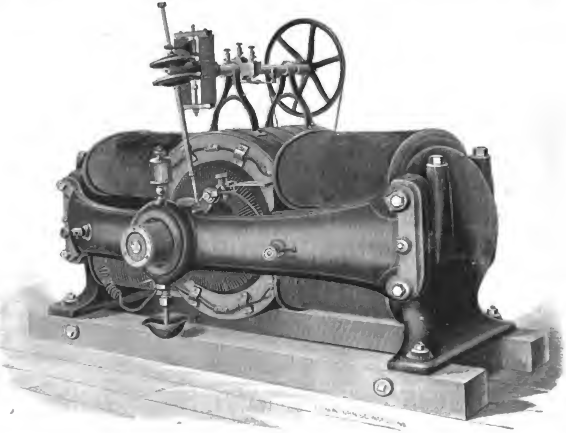

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STONE

VOL. I. INDIANAPOLIS IND. FEBRUARY 1889. NO. X.

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.
PUBLISHED MONTHLY BY
THE D. H. RANCK PUBLISHING CO.
(INCORPORATED.)

D. H. Ranck, Pres't and Treas. A. K. Hollowell, Vice-Pres't.
Louis H. Gibson, Sec'y.

Office: News Building, near corner of Washington and Illinois Streets.

SUBSCRIPTION PRICE, - - - - $2 A YEAR, IN ADVANCE.
D. H. Ranck, - - - - Managing Editor.
L. H. Gibson, - - - - - - - Editor.

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Readers of "STONE" who desire to purchase machinery, or wish information concerning any class of machinery, not advertised in our pages, are invited to send particulars, and we will put them in the way of satisfying their wants without charge for the service.

The Associations.

STONE *has been officially recognized and commended by the following Associations:*

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President—James Sharkey.
Secretary—William Vollmer
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THE one act above all others that should impel retail marble and granite dealers to unite in organized form, is that wholesalers are soliciting orders direct. The obituary notices in the daily and weekly press are the first and most important items looked for by them. If the "dear departed's" sorrowing relatives happen to be well off in worldly possessions, an emissary of the wholesaler, with design book and price list, is sent post haste to interview them on business. What do such advances mean? Nothing but the ultimate extinction of the retailer! What can the retailers, and wholesalers who are not in sympathy with such a policy, do to stop it? Oppose it with the power of organized effort! Let the shibboleth be: "Hands off! Let the local trade alone, or, by the eternal, the local dealers everywhere will let you alone!" Tit for tat! And the local trade under such a demand would be let alone, you may be assured. It is sound business policy for the wholesaler to support the retailer's demands in this matter. And the better portion of them will do it. Neither can stand alone and profit by division. The wholesaler must protect the retailer in his investment and trade; and the retailer must protect the wholesaler by rooting out the scalawags who traffic in unsound material, who forfeit their obligations as buyers of stock, and who demoralize trade by slashing prices. All these reforms may be secured by associated effort.

WE ask the attention of every marble and granite dealer to the communication from President James Harsha in our department of Correspondence this month. The words of wisdom coming from this grand old man should burn into the hearts of every dealer who is zealous for the right and is bound to the precepts of fair competition in trade. STONE wishes there were more such active laborers as President Harsha in the good and just cause of organization. His earnestness, his enthusiasm and fidelity are splendid examples for every dealer to follow. And how much better would all things be if all were like unto him in this work.

EVERY marble and granite dealer in Ohio has been addressed a copy of this issue of STONE.

Every dealer in Ohio should read the call for the semi-annual meeting of his state association printed on page 253.

Every dealer in Ohio who has at interest the life of his trade and is disposed to see that trade prosperous and conducted on right principles should consider it his duty to attend that convention and take an active part in its deliberations.

The labor involved in the correction of the irregularities, the overthrow of abuses and the elevation of just principles in the conduct of the trade cannot be brought about by a few men bearing all the burden, carrying all the weight of conflict. There must be harmonious action, *a pull all together*, and the temple of the juggernaut will come down. The honest dealers of Ohio want protective legislation; they want a better understanding between the wholesaler and themselves; they want a penalty fixed upon rascality by whomsoever practiced; they want a barrier erected against unfair competition and those who connive at and encourage it; they want safeguards built about their business, and the enlisted efforts of all retail dealers, and those who hold business relations with them, to maintain them. This is the time for organization. It is the organized trades that are prosperous. It is the unorganized trades that are now doing the grumbling. There can be no positive action where there is no harmony of purpose. The trade individually concedes there is something wrong somewhere. Every man is able perhaps to locate the evil that afflicts him most. But he is helpless himself to overcome it. His neighbor is like unto himself. Did it ever occur to you that together you might smash the Pandora box and exterminate every wicked thing it contains, if everybody, or even a safe majority, took a hand in the massacre? It can be done. Any organized trade can do it. Dealers in Ohio try it.

[Written for Stone.]

THE ONYX MARBLES.

GEO. P. MERRILL.

THE so called onyx marbles, although of the same composition, differ from those of the common type in being chemical deposits rather than altered sedimentary beds. Like the stalagmite deposits in caves, they are formed by the evaporation of water holding carbonate of lime in solution, and owe their banded structure and variegated colors to the intermittent character of the deposition and the presence or absence of various impurities, mainly metallic oxides. The name onyx as commonly applied is a misnomer, and has been given merely because in their banded appearance they somewhat resemble the true onyx, which is a variety of agate. The stone is properly a travertine. It is an interesting illustration of the misleading character of popular names that the onyx marbles, and particularly those from Algeria and Egypt are so universally known as *alabaster*, while true alabaster as the merest amateur in mineralogy knows, is a pure white and compact variety of gypsum (sulphate of lime) in fact the alabaster boxes mentioned in the Scriptures as used for holding precious ointments are said to have been in reality constructed of travertine.

Owing to their translucency, delicacy and variety of colors, the readiness with which they can be worked and the high polish which they admit of, these marbles have long been favorites for smaller ornamentation and highly decorative work, and will doubtless long continue so. As with the red granites of Syene, the Egyptians knew their value and utilized them as long ago as the time of the Rameses; the ancient Romans, too, appreciated their beauty and utilized them in the construction of their monuments and the interior decorations of their houses.

The only onyx marbles of any commercial importance now known within the limits of the United States is found at San Luis Obispo, California. The stone as I have seen it in the shops of San Francisco is nearly white, translucent and takes a beautiful polish. It lacks the variety of colors of the Mexican onyx, but is nevertheless a beautiful stone and if occurring in any abundance will find an extensive market. A yellow to dull red resinous variety, but occurring only in small masses, has been quarried in times past at Suisin in the same state, and a light emerald green variety in Siskiyou county, but neither deposit is, so far as can be learned, sufficiently extensive to have any great commercial value.

Other onyx marbles are mentioned by the state mineralogist as occurring in the state, but not having seen samples of them I can but quote from other authorities. An orange and blue variety is stated to occur in the southeast quarter of section 9, township 32 south, range 15 east, Mt Diablo meridian. Quarries of the onyx marble have on sundry occasions been opened in the stalagmitic deposits of caves in Missouri, but the stone is stated by dealers to be soft and of too dull a color to be greatly desirable. The similar deposits in the Luray caves of Virginia have furnished occasional blocks of considerable beauty, but the rock is as a rule too coarsely crystalline and friable to be of value even when the colors are good. At least this is the case with a majority of the blocks in the national collection at Washington. I am told, however, that it is a common thing to find in the country houses of Virginia very handsome mantels of this stone, that have been made from stray blocks of stalagmitic material found in the fields. As above noted the San Luis Obispo stone is the only one of commercial importance at present. The Mexican onyx differs from that of California in presenting a greater variety of colors. Creamy white, amber yellow streaked or blotched with green and red, to uniformly light green or green with red blotches are common. Cut across the grain the stone often presents a beautifully banded structure like the grain of wood. Cut in this way, however, the stone is very brittle, and needs always to be backed by slabs of a stronger and cheaper material. The stone occurs in such abundance at Tecalli, in the state of Puebla, that it has been used in rough blocks for building the native houses, and I am informed by M. Ferrari, of the Mexican geological commission, that the name Tecalli was given the locality on this account, the word being derived from the two Aztec words *tetl*, stone and *calli*, house. M. Mariano Barcena, who read a paper before the Philadelphia Academy of Sciences on this stone at the time of the Centennial Exposition in Philadelphia, 1876, reported on it as having a specific gravity of 2.90, (equal a weight of 181 wounds per cubic foot), and consisting of 96.36 per cent. carbonate of lime and magnesia, some 3.54 per cent. sulphate of lime and 0.10 per cent. of water, oxides of iron and manganese, the higher colored varieties showing larger percentages of metallic oxides.

This stone is by all odds one of the most beautiful and variegated of the onyx marbles and is now imported into the United States at the rate of many tons annually. It is used wholly for interior decorations and is to be seen in the larger of any of our jeweler's or house furnishing shops in the form of tops for small tables and stands. Slabs of one inch thickness are valued according to color at the rate of from $2.50 to $6.00 per square foot in the New York market. When cut into thin slabs the stone is quite translucent and I am informed by M. Ferrari that it has been used for window panes in some of the public buildings of the city of Mexico.

The only other onyx marbles at present of any commercial importance are from Algeria and Egypt in Northern Africa. Some slight confusion among authorities seems to exist regarding these localities. Hull, in his work on building and ornamental stones, published in 1872, speaks of the Egyptian onyx as found at Blad Recam near the Ravine of Oned Abdallah. Delesse, however, puts down Oned (or *Oued*) Abdallah as in *Algeria* and states that the Egyptian onyx is from quarries situated at Benisouef, about twenty-five leagues south of Cairo, on the Nile, and at Syout (or Sivat) still farther south. The Syout stone is said to be distinguished from that of Benisouef by its paler, slightly grayish color. As the African onyx now imported is almost universally known as Egyptian onyx it seems probable that it is from either the Benisouef or Syout quarries, possibly from both. The Egyptian stone lacks the variety of colors displayed by that of Mexico, varying only from whitish to amber yellow. It is nevertheless a very beautiful stone and is utilized for furniture tops, clocks, and a variety of smaller ornamentations. The quarries were first worked by the Egyptians and later by the Romans.

The Algerian stone is stated by Delesse to occur at Ain-Tembalek near the river Isser, and to lie in irregular beds varying from a few inches to nearly ten feet in thickness. The stone is stated to be translucent and of a faintly white color, with a compact, but confused fibrous structure, and to weigh about 170 pounds per cubic foot. The Algerian, like the Egyptian quarries, are said to have furnished material for the embellishment of ancient Rome and Carthage, but for over a thousand years the quarries were completely lost sight of to be rediscovered by a French gentleman, M. Delmont, about 1849. Samples of the Algerian stone received at Washington from the Musee National de France are nearly white or of a yellowish color, and in no way remarkable for their beauty.

Travertines or stalagmitic marbles ("L'albatre Calcaire") are stated by Delesse to be abundant in many parts of Tuscany, Italy, notably at Serravezza, Vignone, San-Flippo, Grosseto, and Castel-Nuovo. None of these are so far as I can learn regularly imported into the United States. Small samples in the National Museum marked as from Civita Vecchia and Montalto are of a yellowish or white color and not remarkably beautiful. Other stalagmitic marbles in this same collection, but not of sufficient beauty to be of great value are from Jura in France, and Stuttgart, Germany. The various cavities and caves in the Rock of Gibralter often furnish small masses of a handsomely banded brownish stalagmite which is cut into small ornaments and widely circulated. The National collection shows a small mounted cannon and several irregular blocks and slabs of this material, which, however, may be said to rank as a curiosity rather than a commercial article.

The above list, I believe, includes all the travertines, onyx marbles, calcareous alabasters or whatever they may be called, that are at present known as of value. A quarry within the limits of the United States, of good quality and quantity will prove a rich "find" for somebody.

THE DIAMOND.

The origin of the diamond has been a fruitful topic for speculation among scientists; hence many contradictory theories have been advanced and argued with some show of reason; but after all that has been said and written on the subject, we are still left pretty much in the dark. Theories answer a good purpose, since they often lead the way to truth. But this is not all; they illustrate the ingenuity in human mind in seeking to account for the methods Nature takes for the accomplishment of her secret operations. Some of these theories about the origin of the diamond are very ingenious and interesting, though the amount of truth they embody remains to be proved. It has been suggested that the vapors of carbon during the coal period may have been condensed and crystallized into the diamond; and again, the itacolumite, generally regarded as the matrix, was saturated with petroleum, which, collecting in nodules, formed the gem by gradual crystallization. Newton believed it to have been a coagulated, unctuous substance, of vegetable origin, and was sustained in his theory by many eminent philosophers, including Sir David Brewster, who believed the diamond was once a mass of gum, derived from certain species of wood, and that it subsequently assumed a crystalline form. Dana and others advance the opinion that it may have been produced by the slow decomposition of vegetable material and even from animal matter. Burton says that it is younger than gold, and suggests the possibility that it may still be a process of formation, with capacity of growth. Specimens of the diamond have been found to inclose particles of gold, an evidence, he thinks, that its formation was more recent than that of the precious metal.

The theory that diamond was formed immediately from carbon by the action of heat is opposed by another, maintaining that it could not have been produced in this way, otherwise it would have been consumed. But the advocates of this view were not quite on their guard against a surprise, for some quick-witted opponent found by experiment that it will sustain great heat without combustion.—*Theo. Rothschild, in Bullion.*

QUARRY-FACED WORK.

A visit to any of the large cities will indicate to an observer that there is quite a development among those who build in favor of quarry-faced walls in the structures which are now being erected. Notably is this true in Chicago, many of the finest residences in that city are constructed in this way. Usually the facing is of stone backed up with brick. The work is coursed so that it works in a way to bond into the brick work; that is, in the exposed faces which may be 5½, 8, 10½, 16 inches and so on, usually on the basis of nine courses to each two feet. Thus the stone can be bonded into the brick work at any place desired, not in regular courses but at various intervals in the face of the wall the cost of work of this kind is not largely in excess of good brick work, and in every way more satisfactory.

BROWN AND RED SANDSTONE, OF CONNECTICUT.

FROM NOTES BY HARRISON W. LINDSLEY.

THE surface rocks of Connecticut are Archæan rocks, covering most of the area of the state; a small Lower Silurian area, chiefly in the northwest corner of the state, producing limestones which thus far have been quarried only to a limited extent for purposes of construction; and the Triassic rocks of the Connecticut valley, extending, according to Professor J. D. Dana, from New Haven, on Long Island sound, to northern Massachusetts, having a length of 110 miles and an average width of 20 miles. This formation furnishes the celebrated brown sandstone quarried at Portland and at other places in the Connecticut valley. The principal quarries are at Portland and at Middletown, on the east bank of the Connecticut river, in Middlesex county. These quarries are operated on a very extensive scale, and the most improved methods of quarrying are in use, the work being largely done with steam channeling-machines, as the stone is of such a nature that it is readily cut in this way.

The "Connecticut brownstone," as it is known in the market, is extensively used for all kinds of building and monumental work in the principal cities of the Atlantic border, in Canada, and in the West. Most of the fronts on Fifth and Madison avenues, New York city, are built of this stone. Transportation is by boat and by rail. The wharves are situated within 100 yards of the quarries, and railroad tracks are extended into the quarries. The material is very uniform in character and appearance. A considerable quantity of stone from each of the quarries was used in the construction of the Vanderbilt brownstone house on Fifth avenue, New York, and was used indiscriminately in the front of the building. Blocks about 30 by 7 by 7 feet have been moved in the quarry, and there are natural blocks as large as 100 by 50 by 20 feet, so that blocks of any desired size may be obtained. This stone splits in uniform layers from one-sixteenth of an inch in thickness to 15 or 20 feet thick. The texture is medium as to fineness of grain compared with other sandstones, and is very uniform. According to Dana this sandstone is largely a granitic sand-rock made of pulverized granite or gneiss. The following analysis of a specimen was obtained by Mr. F. W. Taylor, chemist of the National Museum:

	Per cent.
Silica	69.94
Iron sesquioxide	2.48
Alumina	13.55
Lime	3.09
Magnesia	trace
Soda	5.43
Potash	3.30
Ignis iron	1.01
Manganic oxide	0.70
	99.50

The Connecticut brownstone should invariably be laid in walls as it lay in the quarry bed, as the signs of stratification are usually distinct, and the material has a tendency to split when set on edge.

NEW YORK STONE PRODUCTS.

From state statistics it appears that in 1887 there were 342 working quarries in the state of New York. Of these there were granite and gneiss, 11; marble, 7; sandstone, 335; limestone, 73 and slate, 16. The value of the product was estimated at $3,500,000. In 1880 the United States census report indicated the value of product at $1,261,000.

An embankment caved in on some laborers near Oil City, and the verdict of the jury was: Died of gravel.—*Oil City Derrick.*

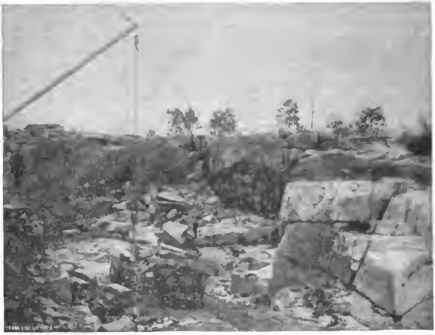
[Written for Stone.]

OUR RED AND PINK GRANITES.

BY GEORGE P. MERRILL.

THE use of red and pink granites for monumental work dates from no more recent period than that of the erection of the obelisks of Egypt. Over 3,000 years ago Egyptian builders, impressed by the beauty and durability of the Syene granites, quarried them out in huge blocks and hauled them weary miles over wastes of sand to be ultimately erected as giant monoliths or used in the interior decorations of their temples and pyramids. So enduring were these monuments under African skies that today, with Egyptian civilization thousands of years in the past and well nigh lost sight of in the gloom of tradition, they still remain the wonder and admiration of every nation and are to be found embellishing the cities and galleries of art among almost every civilized people of the globe. "Kings, emperors and popes despoiled the ruined cities of Egypt in order to adorn the modern cities of Rome and Paris."

The example thus set by an ancient people have been persistently followed by all nations, and to-day the use of stone of one kind and another for every variety and form of structural purposes where strength, durability, and above all architectural effect is desired, is constantly and rapidly on the increase. Red and pink granites have been favorites from the start and particularly so for polished columns, plain or paneled parapets, and the bases of monuments.



While the granite industry of America was still undeveloped nearly the entire supply of this material for our markets was brought from the well known quarries at Peterhead, Aberdeenshire, Scotland. Monuments of this stone are still found in abundance in the shops and yards of dealers in the United States, but can no longer claim to monopolize the market. It is my purpose in this paper to call attention to such of the red and pink granites of the United States as have been sufficiently developed to enable us to form some idea of their extent and adaptability for work of various kinds.

It appears at first thought a trifle singular that the pink granite now most generally found in our markets comes from a belt of granite rock not over ten miles in width that crosses the extreme eastern corner of Maine, extending from Englishman's Bay in Washington county northeasterly to the St. Croix river at Calais. This same belt is believed to pass continuously into New Brunswick, where it furnishes the so-called Macadavie granite, a stone quite well known in our eastern markets. Quarries have been opened at various points on the Washington county belt. That shown in our illustration—reproduced from the writer's photograph taken during the past summer, is the property of the Maine Red Granite Co., at Red Beach, about nine miles south of the town of Calais. The stone is a mica granite of medium texture, very compact, with a close grain and takes a beautiful surface and high polish. Its color is not uniformly pink, but speckled with faint yellow and gray, the effect as a whole being soft and very pleasing.

In the quarry as seen by the writer during the past summer the rock is traversed by two sets of vertical joints cutting each other at approximately right angles and by a third set nearly horizontal. As these are well developed it renders the quarrying of natural rectangular blocks a matter of comparative ease. A pleasing feature of the stone as displayed in the quarry is the almost complete absence of dark spots or blemishes of any kind. This, together with the cubical form of the natural blocks renders it an admirable stone for bases of monuments and statue. It is stated that blocks thirty feet in length can be obtained if desired. The stone is to be found in the markets of all the leading cities from Boston to San Francisco, and is now being used in connection with white Vermont marble in the improvements about the U. S. Capitol building at Washington.

Another quarry of the same stone is worked by the Bodwell Granite Co. at a point some two miles east of Jonesboro near the southern extremity of the belt. Not having personally visited this point I cannot speak so definitely regarding it. At the time of the taking of the tenth census it was reported as situated onthe top of a hill and opened over a wide area to but a shallow depth. But one set of pronounced vertical joints occur here and the rock lies in sheets varying from three to five feet in thickness. Still another quarry of red granite is situated at Otter Creek about eight miles west of Bar Harbor on Mt. Desert. The stone here bears hornblende in place of mica, is of a deep dull red color speckled with gray and is very tough. It is not so generally known in our markets and not having seen the stone in the quarry the writer can give no facts of value regarding it.

Quarries of red granite of very considerable importance are located on Grindstone Island in the St. Lawrence river in New York state. The main rock of the island is sandstone, but numerous outcrops of granite occur on the western side and over 20 quarries, large and small, have been opened at various points. The rock is but little known in the leading markets of the United States, the larger part of it going to Montreal for monumental work and for building stone. A considerable amount of it is shipped to Cincinnati, Toledo and Chicago where it is used mostly for street paving. Two beautiful columns of this stone from the quarries of the Thousand Island Granite Co., are to be seen in the senate chamber of the capitol building at Albany. In texture the stone is coarse, and in the better varieties of a deep red color. It is hard, strong, and is stated by Professor Smock to be very durable and to occur in inexhaustible quantities. Blocks 20 feet in length by 6 feet square are said to be obtainable if desired. Over one million paving blocks were made by a single company here last year. The price of the stone varies from one to two dollars a cubic foot in blocks of not over twenty cubic feet dimensions.

Coarse red granites admirably adapted for massive construction occur in inexhaustible quantities at Knob Lick, St. Francois county, and Iron Mountain, Iron county, Missouri. The stone is very poor in mica, coarser than that of Maine, and of a less pleasing color than either of those above mentioned, and hence scarcely as desirable for purely ornamental work, but as it is attainable in large blocks it is well adapted for rock-faced work in large structures and has been thus used with excellent effect in certain business blocks in Chicago,

The above list includes all the uniformly red or pink granites now quarried to any extent in the United States. A coarse dull red micaceous stone occurs near Burnet, Texas, and has been used, I believe, in the construction of the state house at Austin. Samples examined by the writer are too coarsely crystalline to be of great value, as it cuts to a line or is reduced to a smooth surface only with great difficulty. The weathering qualities of a stone so coarsely crystalline are, to say the least, matters of grave doubt. Other coarse red granite in no way particularly desirable for ornamental work are found in Jefferson county, Colorado, East St. Cloud and Watab, Minnesota, at Sherman, Wyoming, and a finer, more compact variety at Montello, Marquette county, Michigan. The Watab stone was found by Prof. Winchell capable of sustaining a pressure of 25,750 pounds per square inch and to weigh 162.8 pounds per cubic foot. That from East St. Cloud sustained 28,000 pounds on its bed, 26,250 pounds on edge and weighed 163.1 pounds per cubic foot.

Several very light pink granites which I omitted in the early part of this paper had perhaps best be referred to before closing. Trinity church, in Boston, considered by architects in general as architecturally the finest building in America is built from a very light pink epidotic granite obtained at Dedham in the same state. It has been stated on what should be good authority that on opening quarries to obtain this stone the color was found to fade out at slight distances below the surface, and that to obtain sufficient material of uniform hue a wide area was quarried over to but a slight depth. This fact seems to have given rise to the idea that the red or pink color in all granites was but a superficial feature and that the hue would prove lighter as the quarries were worked to greater depth. This idea is certainly erroneous so far as it relates to the Red Beach stone as the writer knows from personal inspection. I am also told on good authority that it is equally erroneous regarding the stone of Grindstone Island.

A coarse light pink granite with greenish flecks is quarried at Milford in this same state, and the stone was used with excellent effect in the new city hall at Albany, N. Y. A portion of the output from the Westerly, R. I. quarries is also of a pink color, but is not, I believe, much used. A beautiful and very coarse red granite occurs at Lyme, Conn., and which has in times past been quarried to a slight extent. Leetes Island and Stoney Creek in the same state have also quarries producing gneissoid and often porphyritic granites of a pinkish cast.

Every dealer can save money, and do us a favor at same time, by patronizing the progressive firms that advertise herein. Mention STONE when you write.

The Missouri Lithograph Stone Quarry Company, at East St. Louis, Mo., has been incorporated, capital stock, $500,000; to quarry and dispose of lithograph and other kinds of stone; incorporators, Martin O. Neil, William R. Evans, and Thomas English.

PROTECTION TO MONUMENT DEALERS.

THE following is the full text of the law passed by the New York Legislature, and approved by the Governor. It is printed in STONE with the object of getting it before dealers everywhere, and particularly in states which have already regularly organized associations that they may be led to adopt measures looking to the enactment of a similar law in every state:

An Act for the Protection of Dealers in Monuments, Gravestones, Inclosures, or other Structures in Cemeteries.

SECTION 1. Every person, firm, corporation or association that shall hereafter furnish or place in any cemetery or burial ground within this state, any monument, gravestone, inclosure or other structure shall have a lien upon such monuments, gravestones, inclosure or other structure, for the principal and interest of agreed price thereof, or such portion of the said price as shall remain unpaid until the same be paid in full, provided such person, firm, corporation or association, shall at any time, or within one year after the bill for the same becomes due, file with the superintendent or person in charge of such cemetery or burial ground a notice in writing to the effect that the person or firm, corporation or association so furnishing such monument, gravestone, inclosure or other structure claims a lien on the same for the purchase-price thereof, or such portion of the purchase-price thereof as remains unpaid with interest, which notice shall also contain a description of the monument, gravestone, inclosure or other structure so furnished, and the names of the person or persons with whom the agreement for the purchase and erection of the same was made, the amount agreed to be paid therefor, and the amount unpaid, and for which a lien is claimed, together with the boundaries of the plot upon which such erections stand, and shall be signed by the person, firm or corporation, or association claiming said lien, and be verified by the oath of the claimant or his agent. It shall be the duty of the superintendent or person in charge of any cemetery or burial ground, with whom any such notice shall be filed, to forthwith notify the owner or owners of the plot so described in said notice, of the filing of said notice of lien.

SEC. 2. In case the amount due be not paid within six months after the service of said notice on the plot owner as hereinbefore provided, the said person, firm, corporation or association so claiming such liens shall thereafter and within sixty days have the right on ten days' notice to the superintendent or person in charge of the cemetery or burial ground of his or its election so to do to remove from said burial ground the said monument, gravestone, inclosure or other structure to the outside of the grounds of said cemetery or burial ground, and after the same shall be so removed such person, firm, corporation or association shall immediately give notice in two newspapers published in the county in which said cemetery or burial ground is situated, that on a day and at an hour named therein, which shall not be less than ten nor more than fifteen days from the date thereof, said monument, gravestone, inclosure or other structure will be sold at public auction, to the highest bidder, to satisfy said lien, which notice shall be signed by the person, firm, corporation or association claiming it, and a copy thereof shall forthwith be served personally on or mailed to the person or persons with whom such agreement was made for such monument, gravestone, inclosure or other structure. Immediately after such sale, said firm, corporation or association so making such sale, shall, out of the proceeds thereof, first, pay the expenses of said sale, and of the removal of the said monument, gravestone, inclosure or other structure from said plot, which expense shall not exceed the sum of fifty dollars in the case of a monument, or of ten dollars in the case of a gravestone or fence inclosure; and shall next pay and retain thereout the amount due upon lien for principal and interest, and the balance, if any, shall be paid forthwith to the person or persons with whom the agreement was made for such monument, gravestone, inclosure or other structure. Nothing, however, in this act contained, shall be so construed as to create any liabilities upon the part of any cemetery association or officer thereof on account of the performance or non-performance of any of the provisions of this act; but no cemetery corporation or officer thereof, or of any burial ground, after notice of the lien has been served upon them, shall in any way hinder or obstruct the removal of such monument, gravestone, inclosure or other structure by the lienor or his employes; nor, after such notice of lien, permit any alteration to be made or inscription to be placed thereon or permit the person or persons with whom the agreement was made, or any one claiming under them, to remove any such monument, gravestone, inclosure or other structure from such cemetery or burial ground without the consent of the lienor.

SEC. 3. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SEC. 4. This act shall take effect immediately.

WHERE TASCOTT IS HIDING.

Detective—"Eureka! I have struck it at last."

Wife—"Struck what?"

"The reason Tascott has so completely disappeared from public view. I know where to search for him now. I'll find him."

"Mercy me! Are you going to the North Pole?"

"No, indeed. I think he must have got a job as clerk in some firm that don't advertise."—*Omaha World.*

[Concluded from January Number.]

STONE AND MARBLE OF GREAT BRITAIN.*

THE amount of water absorbed by stone is sometimes determined by exposing the dry specimen to an atmosphere saturated with moisture for 48 hours, a method which gives a very good results when making a careful comparative examination of two different specimens of stone; but a more rapid and sufficiently accurate method for most practical purposes is to immerse a slab about three inches square and a half-an-inch in thickness in water, until no further bubbles of air make their appearance, when it is taken out; the water on the surface is removed by a piece of bibulous paper, and the increase in weight ascertained. The less durable kinds of stone, such as Caen stone, absorb as a rule more water than Portland, Ancaster, or Doulting, while granite and marble may be regarded as non-absorbent. In a report of a Commission appointed at Munich on the subject of stone, the following tests were proposed for adoption:

1st. Determination of the salts soluble in water.

2d. Determination of its porosity by ascertaining the amount of water taken up by capillary absorption during 24 hours, as well as that absorbed by total immersion.

3d. Exposure of a sample saturated with water and enclosed in a metal case, to a temperature of from 5° to 14° Fahr., such exposure to be repeated ten times.

In carrying out experiments with stone, it is always desirable to have a specimen of stone of known quality and belonging to the same class as those under examination, included in the investigation, since it is difficult to ensure the conditions under which experiments are made being precisely the same under all circumstances.

However much may be taken in the examination of specimens, it must never be forgotten that it is absolutely necessary, before deciding on the relative merits of different kinds of stone as to their stablility or otherwise sor any special purpose, that the quarries should be visited, and the several beds carefully inspected, for in almost every quarry whatever the description of stone may be, a very material difference will be found to exist in the quality of stone yielded by its several beds.

Samples of stone from the same quarry, and sometimes even from the same bed, in which no practical difierence can be detected by chemical analysis, will not unfrequently be found to exhibit considerable variations in physical structure, a knowledge only of which can be obtained by actual inspection of the stone *in situ*. No opportunity should be lost of obtaining information as to the condition of buildings in which the stone has been employed, and all quarrying operations should be conducted under efficient superintendence, in order that no stones of inferior quality should be permitted to leave the quarry.

Time should be allowed for what is termed the "quarsy-water" to dry out, by which the surface of the stone is hardened, and the tendency of pieces to split off so frequently exhibited by newly quarried stones, especially in frosty weather, is decreased. The hardening which takes place during the process of slow drying, by exposure to the air, all matter previously held in solution by the quarry water. This beneficial result is not obtained when any process of artificial drying is adopted, which is too rapid to allow the matter deposite to assume such a crystalline structure as results from the slow drying effect by simply exposing it to air. Moreover, such artificial drying may have an injurious effect, on account of its giving rise to unequal expansion and contraction of the surface of the stone as compared with moist interior.

PRESERVATION OF STONE.

The question of the preservation of stone is one upon which much time and trouble have been expended without, however, leading to the attainment of any very satisfactory results, inasmuch rs when good stone is employed no preserving process is required, and if unfortunately, the best has to be made of inferior stone, it is only in exceptional cases that the cost and trouble involven in the adoption of any such process is likely to be incurred upon an extensive scale.

When the extent of the decay which had taken place in the stone of the Houie of Parliament was first fully realized, it created a good deal of excitement, and a Government Commission was appointed to inquire into the subject, who invited proposals for arresting its progress. In answer to this invitation, a great number of projects were brought forward for the attainment of the desired object, differing widely from each other in their character, many of them being the outcome of much thought and careful study of the question, while others were of a very crude nature and had no pretensions to any merit.

The princisle upon which any process of this kind depends for success is evident, for since it is by means of water that the acid matters which acts so injuriously upon stone obtain access to it, any process which succeeds in filling up the pores with some material of a permanent and unalterable character must be likely to act as an effective preservative. This, at first sight, would seen very easy to accomplish. There is no difficulty in closing the pores of a piece of soft chalk or Caen stone so as to harden the surface and make it non-absorbent of water. When, however, stone is once in position, and we havg it in the form of a vertical wall, the task is a more difficult one. Under such circumstances it is impossible to make any solution penetrate to a sufficient depth by a single application; it requires to be frequently repeated, beginning with very weak solutions, before the stone can be made to absorb it in sufficient quantity, or to any considerable depth; while if it be a mere surface covering, it is likely to be of little more use than ordinary painting, which requires to be renewed every four or five years.

Since we know that of all the constituents of stone there is nothing more permanent than silica, and that the combination into which this substance enters are numerous and varied, and, moreover, that silicates are capable of being readily manufactured by easy and inexpensive processes, it was natural that some solution of silica should have been among the first to suggest itself to the chemist as likely to prove eminently successful as an application for the hardening of stone, accordingly we find that, as far back as the year 1826, Professor Fuchs, of Munich, proposed an alkaline solution of silica, under the name of soluble glass, for the solidification of stone. Professor Kuhlmann, of Lille, subsequently read a series of papers before the French Academy of Sciences, on the application of water glass (silicate of potash) to the hardening of stone. The great drawback to the use of these alkaline silicates is the efflorescence to which they necessarily give rise. In order to avoid this difficulty, other methods were proposed some years later to the Commission appointed to inquire into the condition of the stone of the Houses of Parliament. Amongst these was a solution of baryta, followed by a super-phosphate of lime, which produced a precipitate within the pores of the stone of insoluble phosphate of lime and phosphate of baryta; another was a silicofluoric acid in conjunction with baryta, both of which processes were attended with a certain amount of success.

BLOOD KNOBS.

A dentist, profiting from his bloody experience, invented a compound of blood and sawdust, which is as hard as ivory. It is largely used for door knobs, etc. It is called hemacite, and is in general use all over this country.

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*A lecture delivered before the British Society of Arts, by W. Y. Dent, F.C.S., F.I.C.

BLUESTONE.

THOSE in any way interested in stone and stone quarrying frequently hear the Hudson River Bluestone mentioned. In our researches we notice that the Union Bluestone Co., of New York City, furnished statistics which represented nine-tenths of the product of bluestone in the state of New York for the year 1887, as being 5,753,055 feet, the total product being 6,400,000 feet. In this connection we notice several interesting facts. It is said that in practice it is found where the distance of a quarry from a railroad exceeds ten miles, quarrying is not profitable. Also, that where stripping to the extent of over twenty feet is required, that the stone must be of extraordinary quality and thickness to pay for its removal; that as a rule the thickness of the quarry bed must not be less than one-third of the stripping.

The stone obtained in the several districts where this bluestone is found varies in color, hardness and texture, and consequently in value from quarry to quarry, and even in the same opening. In nearly all localities the bed varies from top downward. There is not much variation horizontally, or in the same bed, hence any given bed may be said to have a certain character, in that it produces a given quality of stone. The color is generally a dark gray or bluish gray, and hence in contrast with red sandstone is called a bluestone. While there is this variation in color, there is a decided preference for the typical bluestone over the reddish or brown-colored grays.

The quarries at Berryville are famous for the large flagging which they handle. This quarry furnished some large-sized pieces for use in front of some of the Vanderbilt property. One piece was 26 feet long, 15 feet 4 inches wide and 7 inches thick. In this connection we make the following extract from the Bulletin of the New York State Museum of Natural History:

"The product of the bluestone territory reaches the market by the Hudson river (boats), the Ulster and Delaware, the New York, Ontario and Western, and the New York, Lake Erie and Western railroads and the Delaware and Hudson canal. The principal shipping points are Malden, Saugerties and Kingston (including Wilbur and Rondout). A great deal of stone is cut for house trimmings in mills at Malden, at Broadhead's Bridge, West Hurley, Wilbur, Kingston and Rondout, but, probably, the larger number of feet are sent into market, simply quarry dressed, for flagging and curbing. It is the flagging *par excellence.* All the residents of New York city and the adjacent towns in New York and New Jersey, recognize its superiority for sidewalks, crosswalks and for curbing. It so compact as not to absorb moisture to any extent, and hence soon dries after rain or ice; it has the hardness to resist abrasion and wears well; it is even-bedded, and thus presents a good and smooth natural surface; and it has a grain which prevents it becoming smooth and slippery as some of our granites, our slates and our limestones, when so used, in walks. It is strong, and is not apt to get broken. But owing to the many thin beds and the use of too thin stones, sidewalks often become unsightly and bad because of breaks, a fault common to all flagstone when laid in such thin beds or blocks.

"For use in houses and business buildings Hudson river bluestone is having an increasing market. It is admirably adapted for lintels, window caps, sills, door steps, water tables, etc., with brick, both because of its strength and its durability. None of our sandstones from other districts, and not even our best granites, are as strong to resist transverse pressure or strain. Tests (comparative) show that it is fully three times as strong, in this way of resistance, as granite, marble, Ohio sandstone and Connecticut and New Jersey brownstone. To resist compression it is not much superior to these sandstones, and not equal to the best granites. And its strength against transverse strains fits it for lintels, sills, caps, and water tables especially. The use for house-trimming material is increasing as compared with what is sold for flagging and curbing or for street work. And the mills in the district are increasing their product from year to year."

IMPORTANT MARBLE DEAL.

An important change in the marble business in this vicinity was consummated on Saturday, when the well-known firm of Gilson & Woodfin sold its property at West Rutland to Vermont Marble Co. The sale involves the transfer to the purchaser of all the real estate, personal property, book accounts, bills receivable and marble on hand at the quarries of Gilson & Woodfin at West Rutland, and the interest of that firm in the branch yards at Boston, Philadelphia, Chicago, Cleveland, Detroit, Toledo and St. Louis. The Vermont Marble Co. assumes all the indebtedness and outstanding obligations of every description of the firm of Gilson & Woodfin; and the property costs the Vermont Marble Co. about $200,000. The real estate is situated just north of that of Sheldon & Sons, and south of that of the Vermont Marble Co. at West Rutland. It is about 300 feet front on the layer, but widens considerably at the rear toward the north behind the real estate of the Vermont Marble Co. This property is important to the Vermont Marble Co. in the development of its property at this point, and from its location is more valuable to that company than to any other interests. The real estate that thus changes hands was purchased of Adams & Allen in June, 1868, by the firm of Clement, Parker & Gilson, the senior partner being Mr. Charles Clement and the purchase price $150,000. The property was then but a "hole in the ground" to outside appearances. Later, Mr. Charles Clement retired from the firm; and it then became Parker, Gilson & Dewey. In 1874, Messrs. Parker and Dewey retired, Mr. Gilson associating with himself Messrs. Waldo P. Clement and John N. Woodfin, under the firm name of Gilson, Clement & Woodfin. In 1878, Mr. Waldo P. Clement retired, and the firm since that time has consisted only of Mr. Edson P. Gilson and Mr. John N. Woodfin.

Since the purchase of the property from Adams & Allen, buildings have been added and other improvements made aggregating in value $75,000, and the stock of marble now on hand is valued at from $30,000 to $40,000. The average output of the quarry has been about 400,000 superficial (1 inch) feet per year. The firm of Gilson & Woodfin is well known to the trade throughout the country. It has done a fine business, enjoyed an excellent reputation and had a high commercial standing, and it has long been one of the substantial and leading firms in local business circles. At present, neither Mr. Gilson nor Mr. Woodfin has any definite plans for the future. It will be the general hope that their interests will be long identified with Rutland, and it does not seem probable that two such successful and active business men any protracted period remain inactive.—*Rutland Herald.*

The transfer as above was followed by the consolidation of all remaining interests on this valuable deposit. The Sheldon, Sherman and Manhattan properties cover the larger portion of the deposit and include its cream and the largest amount of undeveloped deposit, with a valuable mill at Hydesville, Vt., passes into the ownership of the new corporation, known as the Sheldon Marble Company, of Rutland, Vt., with a capital of $1,250,000. The property thus brought under one control includes about 200 acres of land. The undeveloped deposit is considered practically inexhaustible, and it is probably the most complete plant in the country. There are five quarries and five mills and seven finishing shops. The annual capacity of the mills on the present working basis is about 4,000,000 superficial (1-inch) feet of sawed marble, yielding about $500,000. W. P. Clement, of Boston, is said to be largely interested in this deal.

CORRESPONDENCE.

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

"No Man Liveth Unto Himself."

To the Editor of Stone.

SIR: Your paper is read by me with a great deal of interest. It certainly is an educator not only of marble and granite workers and dealers, but of those in other branches of industry I am not much of a writer for publication, but will try and present my views on some of the topics that are being presented by you and others in STONE. 1st. Marble and granite monumental manufacturing, and the sale of the same, is a legitimate, worthy business. We need honorable, worthy men in this branch of industry. All well governed cities have their cemeteries; they spare no means to make them what they should be, beautiful resting places for our departed loved ones. When we visit one of these beautiful homes of the dead, we do not have that feeling of dread horror that is natural and common for us to experience in going to a graveyard that has been neglected, grown over with vines, briers, and weeds, and if there are any marks or monuments to graves, they are found leaning, lying on the ground and repulsive in every way Now what helps to make our modern city cemeteries inviting and beautiful? It is because the monumental structures are looked after and cared for as well as the platting and ornamentation of the grounds. But both must be taken into consideration, one helps the other, and neither can do without the other. To make our monumental work attractive there are well-known principles that must be adhered to; First, is proportion material and workmanship, then a foundation prepared with same skill. To be able to fill the demands in this line of industry in this present age, it takes time and study. You cannot do it by using the mallet and chisel alone, you must know the material. Old men look over your past life of twenty, thirty or forty years of labor at the business. Tell us what you have accomplished. Tell us if you are still pounding, and not reading just such literature as STONE is presenting, which is putting a new phase on the whole matter pertaining to the business. "Why," one says, "we have been in the dark all the time; we have been wasting our time in the business." "Yes," another says, "we have been doing all this, on the principle of main strength and awkwardness." Still another says, "Well, let that be as it may, I beat my competitor, but it kept me poor and injured my health; I could not keep and educate my children as I wished to do, but there was no way out, I was kept tied down to make both ends meet." The times demand a close study of the saying of one of old: "No man liveth unto himself."

The old man reads, he is tired, he makes inquiry, a circular notice of a dealers' meeting comes to him. "Why am I invited to be there? Oh, I can't go, I can't face that sculper." He mentions others, calls some pretty hard names, but when the time comes, he is there, and he leaves there a changed man. He says "I have acted the part of self long enough. That association of dealers, should have started many years ago. Its principles are correct, it advocates doing the business so that each competitor can meet another as a brother." Another asks, "How can that be done?" "Easily and with profit, both to the purse and to the elevation of our business," says the old man, and he tells how.

We must in all of our dealings one with another, and with our customers, stick close to the rules of strict business principles; each dealer, strictly attending to his own legitimate business; speak well of competitors; do not sell work at such a price, that you cannot afford to give to your customer good material and work, such as he knows you bargained to give. There is an evil that our trade is very much afflicted with, *viz:* low prices, mostly to beat some other dealer; their cheap, faulty material and work, and a feeling to get the pay for it and out of the country before it falls down. We cannot afford, to practice deception. Association teaches us that honorable competition is the life of trade. But it takes time and patience for an association to accomplish its aims. It cannot be done at once.

Now, I will say that the principles that the associations of the several states are founded upon are the same, and can be told in a few words, *viz:* Harmony, and good-will toward all. Indiana, Ohio, New York, Canada the New England States and Nebraska, have their state associations and now, some of those states are organizating into district associations and they are all subject to one great head, the National Marble and Granite Manufacturers' and Dealers' Association of America. The work of organizing, where there are so many conflicting elements to harmonize, requires time, and we must not, expect too much at once. Dealers of different sections of a state, meeting in an association of this kind, each have their plans, their ideas of how it should be done. So you must come to this, that all cannot have their individual ways adopted. One great general, liberal principle should govern us all. Then the work of training and educating requires time, but we are built upon a solid foundation. The standard of our business has been advanced. Dealers who have looked at each other as enemies, have come together upon a fraternal level, and the good will that these associations cultivates among its members, not only the retail dealers, but also the wholesale dealers, should be lasting, but that will depend upon the patience and good sense, exercised by us as its members.

Yours fraternally, JAMES HARSHA.

Circleville, Ohio, Jan. 4.

Several Interesting Questions

To the Editor of Stone.

SIR: In a former number of your estimable journal, you requested some of us to "quiz you with questions, and probe you with problems." I have no problems now that I wish solved, but I would like very much to learn all about cement and using it that I can make use of. You mention the use of salt in cement to keep it from freezing, (issue of May, page 6.) and say, "used in considerable proportion." Can you tell what proportion a little more definitely? As salt is a very destructive chemical, when put on stone to melt off ice and snow, will it act, as a secondary action, disintegrate the cement and stone of the building? Do you know whether the presence of the salt affects the strength or color of the cement? If it does, to what extent? In building a family vault, I used sawed flag from Sunbury, O., for roofing. Two of them have turned from a nice drab to a decided brown color. Can you tell what caused it and whether they can be restored to their former color? Will the addition of ¼ per cent. sugar (see June number page 42,) retard the setting of cement long enough to give ample time for placing our porous sandstone? The stone absorbs the water and helps the cement in setting quick, very often before the stone is in exact position. With best wishes for your continued usefulness,

I am yours, etc., ROCHE BURRELL.

New Lexington, O., Jan. 22.

The articles our correspondent refers to were extracted from other publications. We are not prepared at this time to answer with better authority. It is known that different kinds of cement require different treatment in ordinary use. In our opinion theonly thing to do in the matter of decision of the proportion of salt to be used, is to make experiments in a small way, and let the samples set a sufficient length of time to determine what is right. It is a good thing to do this in the ordinary use of cement.

As to the vault roof. There are many things which may cause a piece of stone to change color. It might be that it was caused by something to do with the original formation of the stone, or the same result might be brought about by some local or external condition. Whatever the cause we do not know of any agency that could be used to restore its original color.

With respect to the addition of sugar to cement, we can only say in general terms, what we said about salt, try and see. The article to which you refer might be read again. Its sets forth more clearly than we can, with our data, the relative importance in using sugar with cement, and comes from an authoritative source. In a subsequent issue we will endeavor to collect and present move information of a specific character bearing upon the processes which our correspondent mentions.

The Vermont Marble Co.

To the Editor of Stone.

SIR: We have your favor of the 8th inst. inquiring about our purchase of Gilson & Woodfin. This company has purchased the business of Gilson & Woodfin entire, including its quarry and mill property, all accounts, interest in branches, etc. The consideration was two hundred thousand dollars, and we assume the liabilities of the firm, which, however, it is calculated can be met from its personal assets. The transaction makes very little difference in our business except to increase our capacity and as we believe, put us in much better shape with reference to the production of Rutland marble. The business of Gilson & Woodfin has been one long-established and their quarry, consisting of three hundred feet front on the best part of the layer, has always been considered an excellent one. They have been associated with our company at our various branches, having a small interest in all of them, except the one at San Francisco. By this transaction all of these branches, except the one at Boston, pass into our hands exclusively. In the one at Boston Sheldon & Sons have an interest. We owned the quarry property on both sides of Gilson & Woodfin, so that theirs can be worked to the best possible advantage in connection with our own. It was its connection with ours and its value to our business which induced us to undertake the considerable burden of making so large a purchase. It is not intended in any way to affect our general policy to the trade which we hope to merit by liberal and fair dealings, but trust it will be a benefit to them, however, in our increased facilities to serve them.

Yours very truly, VERMONT MARBLE CO.,
Proctor, Vt., Jan. 11. F. C. PARTRIDGE, Treas.

CLASSIFICATION OF STONE.

ALL the different kind of building stones which seem, from the difference of their characteristics, numberless, can be placed in three classes. First, we have what is known as metamorphic, or igneous rocks—fire rocks—the class to which granite belongs. Then come sandstone and limestone. All rocks may be placed in one of these classes. Granite and kindred rocks are those which have been cooled from a melted state. When the earth was cooling from its melted condition, the first solid crust must have been formed from the fused mass, without any change. The rocks which have been found underlying what we call stratified rocks, the granites, were supposed to be this primary rock, that which cooled from the original fused mass. For many years this was unquestioned, but later investigations have made it seem probable that our granites and kindred rocks were not the original rock; that they were formed by the same process as our limestones and sandstones, but have been changed in character by heat. That is, granite was formed from the broken particles of an older rock, and was deposited under water in the same way as later rock, but that after its formation it was so changed by the action of the heat that the lines of stratification were so obliterated that they remained for years unobserved. In some parts of the exposures of this rock in Canada the granite, or primary rock, shows decided evidences of stratification, and it is supposed that in these places the heat which changed the rock was not severe enough to completely destroy all traces of its formation. This being true, our granites were made primarily as were other rocks, but have been changed, refined by heat in the same way that clay exposed to heat is made into a china vase. We shall see that heat always has this refining action upon earthy substances. Sandstone is formed from the broken particles of other rock. If the rock particles are of granite, we have what is known as a silicious sandstone.

When there is earth or clay in it the rock is known as argillaceous sandstone. These broken particles of rock were carried by water into the ocean and deposited over its bottom. Through it there filtered some cementing material which held the particles together, and the weight of later deposits, together with the cementing material, formed the particles into sandstone. This rock is found in many varieties, depending upon the character of the particles from which it was made and upon their size. The coloring varies greatly. A rock which has iron in it is reddish in color. The old and new red sandstones are samples of this.

Limestone is formed from the remains of shell fish of different kinds, and is essentially a carbonate of lime. It is found in many degrees of purity, the lime often being mixed with earth or clay. Oolitic limestone is different in structure from other varieties, it being formed from concretions as small as the roe of fish, or smaller. It is found in all geological structures, and is forming to-day around coral reefs. Marble is limestone refined and chrystallized by heat. The different kinds of marble and their value depends upon the purity of the limestone from which they were formed and the degree of heat to which they were subjected. The line between limestone and marble cannot be drawn, and runs into the other in a way to make a line of division impossible. From a commercial standpoint a limestone which will answer the purpose of marble, which is hard enough and compact enough to take a good polish, is called marble.

In many places the crust of the earth has been broken open in large cracks which have been filled with a melted mass from the interior of the earth. The walls of these fissures have become baked by the heated mass which filled them, and the rock for some distance from the break has become changed into chrystalline structure by the heat. It is in such regions that we find many of our most valuable rocks.

BOOK AND PERIODICAL REVIEW.

"A RUNAWAY BRIG; OR AN ACCIDENTAL CRUISE." By James Otis, No. 16 of the "Boys' Home Library." Paper, 12mo. Price, 25 cents. Published by A. L. Burt, 56 Beekman St., New York.

The newest volume in the "Boys' Home Library" hardly needs any introduction to the boys of this country; the name of the author on the cover is a sure passport to immediate favor. Everybody knows James Otis to be one of our foremost writers of stories for young people; it is doubtful indeed if there are any books more popular to-day than his. "A Runaway Brig" is in his best vein, full of adventure and life on land and sea; as stirring a tale as any healthy, lively boy can wish for, and as free from any taint of cheap sensationalism as it is possible for a book to be. It has been the aim of this "Boys' Home Library" to give only absolutely good books and the sixteen stories thus far issued cannot be surpassed for real merit and purity in all juvenile literature.

It did seem as though the seedsmen outdid themselves last year in the line of elaborate catalogues, but here comes Vick's Floral Guide for 1889, from Rochester, N. Y., better than all previous issues. "Better" hardly expresses it—rather, we would say, far superior. It has been changed in every respect; new cuts, new type, enlarged in size (opening like an old-fashioned singing-book); contains three elegant lithographs (8x10¾ inches) of roses, geraniums and melon and tomato; besides a very fine plate of the late James Vick and his three sons who now own and manage this large business. These features must make the Floral Guide valuable to their many thousands of customers in this country.

We also notice that Vick returns to the plan started by the founder of the business years ago, of offering cash prizes at the state fairs. One would think they were a little out of their heads to offer to the public such a work as the Guide free, for that is what it amounts to, when they say it will be sent on receipt of fifteen cents, and that a certificate good for fifteen cents worth of seed will be returned with the Guide.

At the recent dinner in London given to the contributors of the Encyclopædia Britannica, the interesting fact came out that of the 50,000 copies sold of the work, 40,000 went to the United States. The Americans, therefore, have bought four times as many copies of the Encyclopædia as the English themselves have, although the work is of English conception and publication. This country has thus absorbed a million quarto volumes of this work,—these facts referring only to the authorized edition of which Charles Scribner's Sons are the American publishers. In view of this surprising fact, Minister Phelps was invited to be present at the dinner, but was unable to go, stating in his note of regret that he nevertheless regarded "the Encyclopædia Britannica as the most useful book in the world."

Place that worthy magazine for our youth, *Wide-Awake*, in possession of your boys and girls. It will bring them as much pleasure and instruction as anything you could do for them. *Wide-Awake* is only $2.40 a year. D. Lothrop Company, Boston, Publishers.

We are not stock brokers or rate cutters. We are journalists with modern ideas, and patrons of the trades we represent. For our commercial standing ask anybody who ought to know.

"We are very well pleased with your publication, and as long as you keep it up to the present standard you may depend upon us as subscribers."—*Triebel & Sons, Peoria, Ill.*

MARBLE FOR INTERIOR DECORATION.

FOR the inside of a building marble is the richest material we have for the production of a lovely color—music without words—painted as it is by Nature's hand, with every tint and tone of delicacy and subtleness, and enlivened, too, by the wildest caprices of beauty. The bar to its use in England is the damp, for when the air is full of vapor the marble condenses the moisture, which stands on it in drops or trickles down it. But as most houses and buildings are now warmed, this need not stand for much, and if we panel our rooms below with wood, there is no reason why the upper part should not be of marble. Few of us know the wealth of England in marbles, but so little is it used that it is hardly worth the quarry owners' while to exhibit adequate specimens of their treasures. We all know the commoner sorts of Devonshire, and some of the beautiful of Cornwall; are we equally well acquainted with the lovely Irish green, superb black, and its red; with the beautiful green of Angleses, and the Scotch and Irish porphyries? Marbles are of every hue except blue, for blue Belge is black and white, and blue Napoleon, or Imperial, is but bluish-gray, and brown is scarce, though we have rosewood marble and California spa Marbles are found in most countries of the world, and there are such vast varieties in Europe that they can hardly be catalogued.

Many of the old abandoned quarries of the Romans have been rediscovered, so that Giallo antico, Rosso antico and other antique marbles have lost their preciousness in value and their epithet. The Romans had a much more pronounced taste for color than the Greeks seem to have had, and were enthusiastic admirers of marble. There are still miles of buried marble on the banks of the Tiber, awaiting a revival of this splendid taste. It is only lately that any appreciation of what polished marble can do for us, has revived, and there are but still few examples of the use of fine marbles in large masses. Still fine examples may be seen in the staircases at Dorchester House and Goldsmiths' Hall, and in halls at the Holborn Restaurant and the National Gallery. The late Mr. Burges had the upper part of his dining room lined with red Devonshire. In Italy the former passions for marble may be seen in the buildings of Roman, Byzantine, Romanesque, Gothic and Renaissance times—*i. e.*, at Rome, Ravenna, Venice—especially at St. Mark's—at some of the churches at Genoa, at Pisa, and in the mausoleum of the Medici at Florence. Great taste in color is requisite for the proper arrangement of colored marbles; at present no one cares to exercise this taste as a profession, as there is so little effective demand, and, in spite of the low tone of marble generally, it is much easier to make a vulgar or discordant arrangement than a strikingly good or harmonious one.

The fashion of using white marble chimney-pieces, white marble bas-reliefs, white marble statues, and busts in decorated apartments, is absolutely fatal to low-toned schemes of color decoration, and, as a rule, all gorgeous schemes of color are low-toned, and white must then be used most sparingly as a jewel. White can only be sparingly ornamented with morsels of full color, or very high-toned decoration must be used in conjunction with it, as this alone can sustain masses of white.

Sculptors, unhappily, have a tradition that deep red is a good background, but, green is its complementary, and makes the statues or bas-reliefs look even colder than the natural color of white marble.—*Prof. G. Aitchison, A. R. A., in the Furniture Gazette.*

AMONG THE RUINS OF ANCIENT SIDON.

A remarkable, not to say suspicious, story of archæological discovery comes from Saida, the ancient Sidon, in Phœnicia. According to the narrative, which *La Semaine des Constructeurs* quotes from the *Bosphore Egyptien*, a certain M. Durighello was digging in the ruins of Sidon, when he came suddenly upon a wall buried several metres below the surface of the earth. There was nothing whatever on the surface to indicate that anything of interest lay beneath, but M. Durighello, pursuing his investigations, came upon a door in the wall, which had been blocked up with masonry, and, on being cleared, admitted him to a very strange and curious place. He soon discovered that he had found his way into a subterranean temple of Mithras, which had been purposely built underground by the priests after prohibition of the Mithraic worship by Constantine, in order to avoid the observation of the Roman police. The concealment has been effectual, and after the priests, on deserting the temple (perhaps to go in search of worshipers), had built up the door, no one had entered it until M. Durighello's good fortune had brought him to it. On breaking through, he found himself in a long corridor, partly filled with earth which had fallen in from above, and lined with niches, in which were fourteen marble statues, representing warriors in menacing attitudes. Not deterred by these objects, the explorer passed through the corridor, and found himself in a "vast circular hall," covered with a polygonal dome, springing from twenty-four coupled columns. In front of each pair of columns was an altar, and by each altar a sort of marble bedstead. The altars were ornamented with the signs of the zodiac, sculptured in low relief, and on the walls, between the pairs of columns, were represented scenes very inappropriate to the stern military virtue enjoined upon the disciples of Mithras. Around the room were scattered candelabra, in marble and bronze, of wonderful beauty, and the floor was paved in mosaic of colored glass, inlaid with gold. In the middle stood a gigantic bull of marble, with horns covered with gold plates, and in front of the bull was a staircase, which led down, through a narrow opening, to seven consecutive subterranean apartments, each of which was a little smaller than the preceding one, while the walls of all were almost concealed by altars, groups of statues and ornaments of marble, ivory, silver and gold. It is hardly necessary to add that a choice selection of these objects is now on exhibition in Paris, and that a wealthy amatuer might possibly be able to secure specimens. So far as architects are concerned, while few of them could afford to buy such costly *bric-a-brac*, a good many would pay something for information as to how the priests of Mithras managed to construct a "vast polygonal dome" underground, without attracting the attention of the "Roman police" on the surface, or how the excavated material was disposed of without the knowledge of the same vigilant officers.

VALUABLE DEPOSIT OF CEMENT ROCK.

It has been discovered that there are immense deposits of cement rock of a grade equal to that from which the famous Portland cement is produced, on each side of the romantic canyon, near Devil's lake, known as Parfrey's Gorge. The beds are believed to cover an area of over two hundred acres and to extend from 500 to 700 feet into the bowels of the earth. The walls of the gorge proper are composed of pudding-stone, or what the geologists call conglomerate—a mass of pebbles and bowlders, varying in size from that of a buckshot to chunks weighing tons, firmly bound in a matrix of solid cement. The rock rivals granite in its solidity and attests the staying qualities of the cement which underlies the entire formation in the vicinity. Outside of the gorge the cement rock is absolutely pure and free from foreign matter. Nothing like it has yet been discovered on American soil. The value of this mine can be computed from the estimated area of the deposit, multiplied by the last quotation on Portland cement, which is above $3 per barrel, while common domestic, or so-called hydraulic cement, is worth considerably less than $1 per barrel.

HOW A STATUE IS CREATED.

A vague idea prevails as to how a sculptor works out a statue. The truth is this : The artist puts the conception as nearly as possible into a material form by the aid of clay. A plaster cast is then taken of that. By this time deft mechanics have a block of marble, "square and out of mind," in the most perfect manner. Then the cast is set alongside, and by means of square and rule and callipers, the model is copied point by point. The mass is hewn from the block rapidly until a general outline is reached. Then the mechanic proceeds with more skill and care, and gradually reduces it until the exact image of the original model is reached. Then a still more skillful artisan undertakes it, and does almost marvels under the artist's personal direction. At last the artist puts on the finishing touches, which give the individuality, the excellence, the semblance of the person modeled after, or which conveys the idea that the artist has fancied into creation. A statue, like other works of art, is but a vehicle, as it were, to transport the thought that generated in the artist's mind, and was modeled and rounded into a perfection by his perseverance that deilghts esthetics and others in proportion as they understand it. These finer touches can be done by none but the designer, for he cannot instruct others what he wants. A faint characteristic a delicate lineament, slight indication of a line will make or mar by imparting an expression desired or not. So the artist must take the chisel, and study and carve, and carve and study until the block is the incarnation of the thing formulated in the artist's mind.—*Harriet Hosmer.*

SCULPTURE.

Sculpture must be first a commonplace, a fashionable necessity in the home life, before it can flourish greatly and nationally in a commonwealth like ours. The field of the sculptor as the rival of the painter in the daily affections of amateurs is practically unworked, scarcely suspected ; yet the signs of its presence are on all sides. One straw is the removal of an old prejudice against plaster-casts, used in lieu of costlier materials. As to what is now called sculpture—backed as it is by no large mass of trained, cultivated fosterers—the silent nation of marble and bronze statues which men think of when sculpture is mentioned becomes already oppressive. Our parks will soon offer the cluttered chaos of the cemetery and become a derision. But will not then a wider taste, wearying of easel pictures and pictures on the wall, carved woods and bric-a-brac, turn to statuary for agreeable, companionable forms of art, at once calmer in temperament and more indestructible than the fashionable decorations of our homes? It is only by beginning at the fireside that we can cultivate the public taste to the level of Athens and Florence, and have the knowledge to bid our sculptors grapple with those grandest forms of art that for their backgrounds demand a sea, a landscape, or a steepled town. —*January Century.*

A POINT IN STONE SMASHING.

It is well known that a stone, however large, may be broken by striking a sufficient number of blows with a hammer, along the line where it is desired to break the stone. In this process the force of the blow is expended in gradually weakening the cohesion of the particles in a line following the direction of the blows. This weakening is increased by each successive blow until finally rupture occurs.

Any quarryman, stone, granite, or marble dealer or worker who subscribes for STONE for 1889 we guarantee will get tenfold value, or the subscription price will be refunded.

MEETING OF OHIO ASSOCIATION.

COLUMBUS, O., January 7, 1889.

To the Members of the Marble and Granite Dealers' Association of Ohio, Greeting:

First of all, dear brethren and friends, we wish you a happy and prosperous New Year. The next best thing, we hope you may each and every one be so circumstanced that you may be present at our next Semi-Annual Meeting, in Dayton, Ohio, on February 12, now near at hand. We need your co-operation, therefore we hope you will not fail in this time of need to aid us by your presence and influence. Other States, and the Canadas, like ourselves, have seen the wisdom of uniting together for mutual benefit and protection. Since our last meeting Nebraska has formed a State Association, and will no doubt meet with us at our next National Association meeting to discuss important questions pertaining to our trade. We have done good, and we can do much more if we come up in unity together. Take a holiday, dear brethren, and let us meet together and see if we cannot reform our methods of doing business, so that we may receive a fair compensation for our work. To the wholesalers doing business in our State, and to the retail dealers within our State who are not members, we would most cordially invite you to meet with us, and if after you learn our object in forming an association, you may deem it of advantage to you to join us, we shall be glad to welcome you and place your names upon our membership roll. Members of other sister state associations and our first cousins and brethern over our borders in Canada, we extend a hearty welcome to you one and all, and hope to have as many of you as can meet with us and give us the benefit of your experience; the latch-string is out, we shall be glad to have you visit us on the occasion. We mean better things for you and for ourselves than we have had in years past. Dayton is a very pleasant little city, located almost in the heart of our noble old Buckeye State. We have assurance that reasonable hotel rates can be had, and that we shall have a pleasant meeting place in the parlors of the Phillips House. Meeting will be called to order promptly at 10:30 A. M., but if you cannot reach there in time do not stay away, as the main part of our business will be transacted in the afternoon, and we may possibly have a two days' session. These reunions are both pleasant and profitable. One forms new acquaintances and gets newer and better ideas, understands himself and the trade in general better. Our aim is to do you, as well as ourselves, good in many ways. Come and meet with us once, and see and hear for yourselves. Hoping to meet you all there, and with best wishes, we remain,

Fraternally yours,
JAMES HARSHA, President.
HOMER M. WOODARD, Secretary.

SPECIAL NOTICE.

To the members of the Ohio Marble and Granite Dealers' Association, who are in arrears for dues: Brethren, we hope that you may cheerfully respond, by sending your dues at once to the secretary.

Our Association stands in need of funds very much, and we feel confident you will be well repaid in many ways, for the small amount you have promised as aid to our organization, which you have perhaps unintentionally neglected to send in. Little good can be accomplished without some money to back it up. We want to try for a better State Lien Law, by asking our legislative bodies this winter, to pass a law similar to the New York law, enacted last year, for the better protection of our trade. Other builders of structures costing less than some monumental work, have protection by a lien upon their work, while we have no protection, after work passes out of our hands into those of irresponsible ones. Please remit before our next meeting, at Dayton, on Feb. 12.

Fraternally yours, JAMES HARSHA, Pres.
HOMER M. WOODARD, Secretary.
48 West Broad St., Columbus, O., Jan. 10.

THE INDIANA S. S. AND S. MONUMENT—IX.

Our illustration this month is the design presented by Wm. A. Youmans, of Ottawa, Ill.

The subject is a Pantheon surmounted by a pedestal supporting a campanile.

The basement and first story is designed for a memorial hall and depository of trophies. The second story is intended for a picture gallery and for the display of sculpture.

The height from ground to apex is 215 feet, and the diameter of base 64 feet.

THE IOWA MONUMENT COMPETITION.

THERE is evidently a desire on the part of the legislature of Iowa to erect a soldiers' monument, and the commissoners are undertaking a step in that direction. However, it is apparent that there is a good deal of uncertainty as to the method to be adopted on reaching the proper result. If there is a disposition on the part of the commission to investigate as to the proper methods, all will be well and good. As it is, however, nothing is to be expected. The circular issued by the commission is indefinite in many ways and on its basis anything but failure will be accidental.

In order to get a good monument it is necessary that a good design should first be secured. People who are used to doing other things well may be capable of judging as to the general excellence of a design of this kind. Especially is this true when the latitude in the preparation of drawings is so great, as would be the case under the general instruction of the commissioners. The design is more than the monument; it is more than anything which goes into it. The design is everything. The material which is a part of the monument has no value if it is not in the proper artistic form. The monument is creditable or otherwise, not because of the labor and material which go into it, but from thought which guides the labor and the disposition of the material. This is the design. The design is the thought expressed in tangible form. It is that which adds value to the material and labor.

Hence, the commission can hardly overestimate the importance of the selection of a design. Their first work must be their greatest work. That is of the utmost importance. They must make haste slowly. It would appear that everything that they have thus far done must be undone. We can do no better than to call the attention of this commission to the work of the Indiana commission in the selection of a design. Not only were the instructions to the designers properly framed, but all was done in a way to invite designs from the best men in that line in the country and the world. The commissioners did not rely upon their own judgment in all these matters; they called in competent critical advice, paid them fairly for their work, listened to what they had to say and were guided by their judgment. With a circular such as the Iowa commission have sent out, the best designers will steer clear of this work, and at the most this commission will have a lot of rubbish from immature, unsuccessful and incapable designers. There are always plenty of people whose success has been very indifferent who will go into a competition of this kind no matter what basis it rests upon. However, this is just the class that will be deterred from entering when the instructions are properly drawn and the criticism of the designs placed in the hands of capable experts.

It would be a very disastrous matter if this competition should be allowed to proceed under the present regulations. It may be asked, what is there to be done? We can do nothing better than to refer to the instructions to designers in the late Indiana competition. First, within the cover of the published pamphlet is a copy of the act providing for the erection of the monument, and which created a commission, and in general terms set forth their duties. This gave to those interested a statement of the general authority of the commissioners. The instructions then proceeded to state that it was the purpose of the competition to assist the commission in determining the general character of the monument. Following this were the instructions, which described the site and stated that the designs submitted could comprise a tower or column, a memorial hall or vestibule with mosaics, bas-relief statues or groups of sculpture, either out of doors or within. Then the material of which the monument was to be constructed was defined and it was indicated that the competitors should furnish with the design a description and also drawings and estimates of cost on the basis of prices for material and labor then ruling. Next was indicated the number of drawings that were to be furnished, and the scale to which they were to be made. At the same time it was stipulated that they were to be in black lines and that no shadows were to be cast, that the execution of the drawings was to be entirely simple and without embellishment. It was specified that the paper used was to be of uniform size and that they were to be furnished for inspection without framing, mounting or other embellishment. The time of the close of the competition was mentioned. It was required that the board of experts which was appointed by the commission and which consisted of an architect, a civil engineer and a builder should examine all plans and furnish to the commission a written report and that their recommendations be regarded and fully considered by the commissioners on making the selection. The designs were to come in without name. All were to be under motto. The author of the design being required to place his card in a sealed envelope with motto attached, to be opened only after the best design had been selected. Seventy odd designs were received and two selected, which were premiated in the order of their excellence it having been originally provided that this should be done. The first premiated design was selected for execution. The key to the whole situation was that the architects and artists of the country had confidence in the experts. They came forward with their designs. The work was conducted with the utmost fairness and intelligence and the result was highly satisfactory.

There is no struggle more annoying or more unsatisfactory than that which springs from a lot of competing architects. In this case the entire trouble of this kind was avoided. The only architect who appeared before the commission personally was the one selected to execute his design. There was a complete absence of anything uncomfortable. The Iowa commission must bear in mind that without competent expert advice they cannot expect to receive designs worth considering. The best designers of the country will not go into a competition of this kind until they feel assured that the commission is acting under competent advice. They are no more capable of selecting designs for this great work that would be the experts for conducting the personal business of the commissioners. After the designs have been selected the work of the experts is measurably at an end. The commissioners would then be acting in conjunction with a capable architect or designer. Experts are necessary in securing a design from a capable architect.

GENUINE ANTIQUES.

"Did you ever notice that the confectioner's name is on these cookies?" querried Waggley.

"No."

"Well, it is, and there's only one thing lacking about it."

"What's that?"

"A date."

And then the landlady, after dinner, took 'em out on the back-stoop and sand-papered 'em.—*Detroit Free Press.*

THE TOMB OF THE GOULDS.

THE Gould mausoleum in Woodlawn Cemetery, New York City, is often said to be a copy of the Parthenon. This is not true. In its general outlines it is like the Parthenon as the Parthenon is often accepted as the type of the old Greek temples. But the architecture of the Parthenon was Doric, while that of the Gould mausoleum is Ionic. The Parthenon, too, had many more columns than the present structure. The mausoleum is, technically speaking, a Greek hexastyle, peripteral temple, having six columns on each side in single rows, the corner columns being counted twice. It is nearer like the old temple of Theseus at Athens than any other now extant. In all its proportions and parts of frieze and cornice, architrave and entablature, entasis and skylobate the old classical measures as they have been handed down have been rigidly followed.

The temple is built throughout of Westerly, R. I., granite. It is twenty-one feet wide, thirty-three feet long and twenty feet high to the apex of the roof. The columns are ten and one-half feet high and thirteen inches in diameter in the widest part, having the slight swell of the Ionic order. Three rows of steps, running all around, lead up to the temple and form the exterior of its base.

Between the rows of columns and the walls of the temple proper is a considerable space. The columns and the walls are alike unoramented. The temple fronts the south, and before the doorway the columns part or there is a gap—apparently left by the taking out of the center column. In the doorway are two doors of bronze opening inward. They are eight feet high and two feet wide, and weigh a ton each. The lower part of the doors is of solid bronze, paneled, and each part is ornamented on the outside with a dragon's head, a big ring swinging in the mouth of each dragon. The upper part of the doors is a fretwork of cherubs and vines. The open spaces in the fretwork are large, comparatively, and through these a perfect view of the interior crypt can be obtained.

The interior is twenty feet long, seven feet wide, and thirteen feet high. The roof of it is one solid slab of granite, which weighs six tons. The ceiling border is paneled with egg and dart molding. The floor is one plain slab of marble. Along the sides of the interior are the catacombs. There are twenty, ten on each side, in four rows of five each, the rows on each side being separated in the middle by a granite slab. The catacombs are each seven and a half feet long and two and a half feet wide and the catacomb walls, from the inside of the catacomb to the outside of the mausoleum, are eighteen inches thick. These walls are granite, of course, but the inner walls, those facing the interior of the crypt, are of light pink and cream colored Tennessee marble, highly polished, so that the interior of the mausoleum has a warm tint. These interior walls are, in fact, simple slabs of marble closely fitting into the openings of the catacombs, and capable of being removed so as to allow the coffin to be set in or withdrawn. Upon the front and at the end of each slab are bronze rings fitted upon the slab by means of bands of bronze, and by these the slabs may be lifted out. A stained glass window at the back lights the crypt. It pictures a heavenly choir of angels. The faces of the choir are refulgent in the light of grand candleabra. The arched window is six feet high and three feet wide.

The roof of the mausoleum consists of granite slabs thirty-two feet long, each weighing fifteen tons. They are so joined and locked together that they can not be displaced, and that water can not trickle through the seams where they join. The slabs overlap each other, in fact, and there are no seams. The whole temple weighs about three hundred tons. Is rests on a solid concrete foundation, eight feet thick, which was very slowly and carefully laid. The same method of concreting was followed which was afterward adopted for making the foundation of the Statue of Liberty on Bedloe's Island. The contract for the mausoleum was given in January, 1883, and the entire structure was completed in December of that year. It was built very slowly and cautiously. Mr. Gould inspected the progress of the work, and guarded against what he thought was any desire on the part of the architect to make the mausoleum at all ostentatious. It is understood that the cost of the mausoleum was about $80,000.

Geologists agree in ascribing the orgin of clays to the decomposition and disintegration of the felspars in granite, gneiss, mica slate, and clay slate by atmospheric erosion and trituration in water. The argillaceous rocks, from which clays are principally derived, are disintinguished by a peculiar earthy odor emitted by them when breathed upon. Clay-beds are due to the deposition of water-born material at the bottom of estuaries, lakes or seas; and boulder-clay is ascribed to glacier action. Any substance formed of minute particles of decomposed earthy material, which, when worked up with water becomes plastic or capable of being moulded, is commonly called clay. No natural deposit of absolutely pure clay has been found; but the residue, after washing out all the impurities from clay, is a hydrated silicate of alumina, which is the plastic, and consequently the most important, constituent of clay, insoluble in water and incapable of supporting vegetable life. Water combined with the silicate of alumina gives it its plasticity. Part of this water is merely absorbed into the pores of the clay, and can be driven off by exposing the material to a temperature of about 212° Fahrenheit; but the remainder, which is in combination with the clay, can only be removed by a prolonged high temperature, as in baking bricks, depriving the material of its plasticity, and causing it to shrink in proportion to the bulk of water expelled. Some analyses of different kinds of clay gave from 46 to 66 per cent. of silica, 22 to 38 per cent of alumina, from 5 to 13 per cent. of water, small variable quantities of oxide of iron and lime, and traces of magnesia.—*Prof. W. M. Gallon.*

This is a journal for producers, workers and users of stone, marble and granite, and no one has yet had the hardihood to say it isn't a creditable one. Now is the time to subscribe.

THE new design book issued by E. C. Willison, 68 Boylston street, Boston, is literally "going off like hot cakes." Over 500 copies were sold during the month of January. It is universal testimony that no such designs have ever been put on the market. The book contains sixty designs of the latest style work ranging in price from $50 to $500. A key accompanies the book, containing two sizes with prices on each design, in four of the most popular granites in use. You have the privilege of returning this book, if not satisfactory or as represented, by paying expressage both ways. The price of the book is but $6.00. Firm name on cover, 50 cents extra. Or, in other words, 10 cents each for the designs all bound.

Ethel (to her betrothed)—Do learn to skate, George, I'm sure you would look lovely on ice.

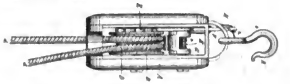
George (a young and rising undertaker)—Look lovely on ice, would I? Thank you, no hurry about it.

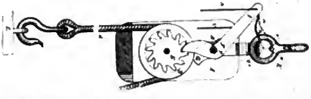
Old lady (to grocer's boy)—What makes the price on them potatoes so stiff, boy?

Grocer's boys—It's because there's so much starch in 'em mum. —*Life.*

RECENT PATENTS.

No. 396,113—Hoisting-Tackle. Charles F. Bait, Brooklyn, N. Y. Application filed May 12, 1888. Patented Dec. 25, 1888.

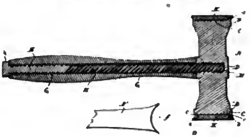




The object of this invention is to so construct a pulley-block or hoisting-tackle that the load may be locked or held in any position, and so that the descent of the load may be easily controlled as circumstances may require. In the accompanying drawings, Fig. 1 is a side view of a single pulley hoisting-block. Fig. 2 is a vertical section of the same on the line 1 2, Fig. 1. In Figs. 1 and 2 is illustrated the invention as applied in one of its simplest forms to a block A, with a single pulley, B, around which the hoisting-rope D is passed with a double turn, although the turns may be increased. One end, d, of this rope is the free hoisting end, while from the other end, d', is suspended the load L, Fig. 2. The pulley block is provided with the usual suspension-hook, K.

The main feature of the invention consists in so constructing the pulley that the load may be locked at any desired height, and may be lowered easily and slowly or as fast as may be desired, and the rope freely manipulated when the load is off. For this purpose a lock for the pulley and a brake for the rope are combined.

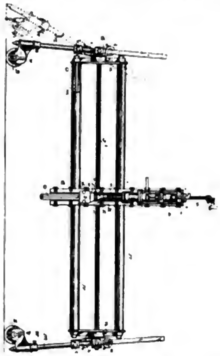
No. 393,789—Mallet. Nathaniel B. Runnals, Pittsfield, Me., assignor of one-half to H. J. Brackett and N. C. Smith, same place. Patented Dec. 4, 1888.



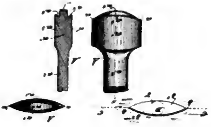
This invention relates to improvements in mallets, having for its object to provide a simple and cheap device which will not bruise or injure the end of the handle of a chisel.

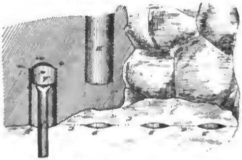
No. 394,212—Combined Drilling, Channeling and Gadding Machine. William L. Saunders, New York, N. Y., assignor to the Ingersoll Rock Drill Company, same place. Application filed June 9, 1887. Patented Dec. 11, 1888.

This invention consists in an improved machine for sinking round holes and cutting longitudinal channels in stone, it being adapted to perform both the processes known in the art of stone-quarrying as "channeling" and "gadding," the same organization being adapted for use as a gadder capable of operating in any position, and with slight modification and the substitution of a gang of drills for a single drill-steel it becomes a channeling machine—that is, one capable of cutting a continuous open channel, also in any desired position. This improved machine comprises a reciprocating direct-acting percussion rock-drill mounted in a shell-piece, within which it is vertically adjusted by means of a feed-screw in the ordinary manner. The shell is carried upon a pair of horizontal supports, preferably tubular, which supports are centrally pivoted upon a rod, bar, or continuous screw, which forms the axis of the drilling apparatus, the tubular supports and engine being radially adjustable thereupon and adapted to be supported at any angle, from the horizontal to the vertical, the axial support being also formed with a continuous screw thread, which, being connected by suitable gearing with the carriage carrying the drilling engine, affords means by which the engine is moved laterally in either direction along its supports when making an open cut or channel. The extremities of the axes upon which the tubular supports are mounted pass through end pieces which carry extensible sleeved arms, within which latter are adjustably secured the legs upon which the machine as a whole is supported, and the legs themselves are each provided at its extremity with a caster-wheel, upon which the machine is supported when not in operation, in order to facilitate its travel from place to place; but when in operation by a simple contrivance the caster-wheels are removed from the floor and rendered inoperative, and the machine supported upon the ends of the legs themselves, or upon leg pins, so as to have a solid and firm bearing upon the floor of the quarry. According to the prior state of the art two operations have been necessary to channel out a block of stone, a gadder being employed to put in a row of horizontal holes at the bottom of the bench, and a channeling-machine being used to cut an open channel from above, the mass of stone inclosed between the channel and the row of holes being broken out by wedges. Various other forms of apparatus have been used for this purpose, including percussion-drills, wi which a series of non-communicating round holes were bored, the partitions between holes being broken down by a brooch, thus forming a channel. Rotating diamond drills were also used for the same purpose, also the channeling-machines of the kind previously referred to. Up to the present time no other machine has been produced or method devised by which both operations are satisfactorily carried out.



No. 395,106—Rock-Drilling Tool. James W. Wyckoff, Marquette, Mich. Application filed Nov. 23, 1887. Patented Dec. 25, 1888.





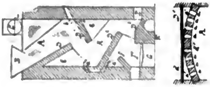
This invention relates to a drilling-tool adapted especially for use in quarrying rock, in which elliptical holes having angular ends may be produced by direct reciprocation of this single drilling implement, and whereby when a series of such holes are drilled with their angular extremities or ends in alignment with the desired line of fracture of the rock, and when these holes are charged with explosives which are fired, the rock will be split off into merchantable blocks or slabs and without waste and in a manner to require comparatively little labor in dressing or finishing the quarried stone.

No. 394,151.—Limekiln. Robert H. Barns, Brooklyn, New York. Application filed December 23, 1887. Patented Dec. 11, 1888.

The object of this improvement is to provide for a free escape of the released vapor, moisture, and carbonic acid arising from the treated limestone or shells; also, to provide sufficient overturning movement and travel of the limestone or shells to assist in the release of the vapor, moisture, or carbonic acid from every portion and side of the material treated.

A further object of the improvements is to provide for the successful and total burning of the gases of the coal and lime; also where shells are treated, to provide for the thorough burning of the gelatine contained in the shells.

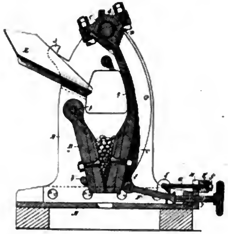
In the regular operation of the kiln a fire is started in the furnace and the kiln-chamber gradually filled with the limestone or shells to be burned. The portion generally occupied by the shells is outlined in Fig. 1 by dotted lines. As the furnace fire develops and the walls and partitions, as also the lime, become heated, carbonic acid is released, comes in contact with the flame and gases from the furnace, or with the walls and partitions when at a white heat, and being ignited, burns and escapes through the flues to the uptake or chimney, giving out heat to the shells and partitions in their passage. By the burning



of all the gases and offensive feature of the limekiln is done away with, and the kilns may be located without injury to surrounding premises in any portion of a large city where any surplus heat may be made use of. The flues *a′ a′* may of course be omitted, and the products of combustion and gases forced to pass through the lime while being treated. Such method would not, however, be as efficient as with the smaller flues, *a′ a′*.

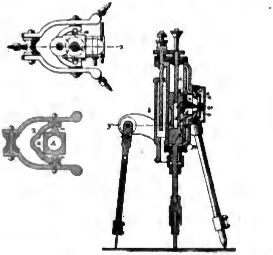
The depth or size of chamber A is not limited. It may be made higher and additional angular partition-guides inserted for a longer process of burning. Where the flues *a′ a′* are not used and the partition-trays made double, the lower portion is preferably perforated to admit heat to the space between, and a few edge holes inserted in the upper portions.

No. 393,440.—Rock-Crusher. Joel B. Low, of San Francisco, Cal. Application filed May 16, 1888. Patented Nov. 27, 1888.



This invention relates to that class of rock-crushers in which the rock is crushed between opposing jaws. The object of the invention is to provide a simple and effective rock-crusher which can be readily operated and adjusted to crush the rock to any degree of fineness, and which can be easily cleaned in all its parts, making it especially adapted for the use of assayers and for any small work where samples are desired.

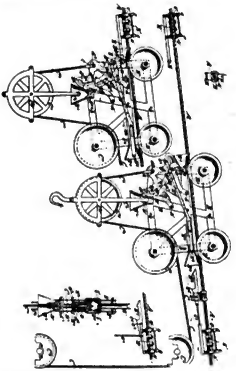
No. 10,975—Steam Rock-Drill. George E. Nutting, Waltham, Mass., and Joseph C. Githens, of New York, N. Y., assignors to Addison C. Rand, New York, N. Y. Original No. 161,631 dated April 6, 1875. Application for reissue filed November 12, 1888. Reissued Dec. 11, 1888.



This invention relates to steam drills; and it consists in the mode of operating the port-valve of the steam-cylinder, which is effected by a rocking lever actuated directly by the piston in such a manner that the valve moves in the same direction as the piston.

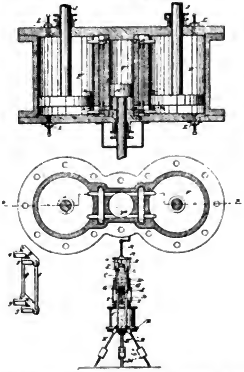
No. 393,643.—Hoisting and Traversing Apparatus. Norman C. Harris, of Poultney, Vermont. Application filed January 6, 1888. Patented Nov. 27, 1888.

This invention relates to apparatus which is employed where it is desired to raise a weight, as from a quarry, and then to traverse or move the raised weight laterally for any desired distance to the place where it is to be deposited.



The invention is particularly described, and pointed out in the claims.

No. 391,203.—Electro-Magnetic Air-Compressing Rock-Drill. Richard G. G. Moldenke, New York, N. Y. Application filed January 28, 1888.



The object of this invention is the application of electro-magnetism to the operation of rock-drills and similar devices in a more practicable and efficient manner than has heretofore been done. The invention, specifically stated, consists in combining with an electro-magnetic motor one or more compression-cylinders provided with suitable valves and ports communicating with a cylinder containing a piston to which the drilling-tool is connected, and beneath and above which the compressed air from the compression-cylinders is alternately admitted.

In other words, the essential feature of the invention is in the introduction into a drilling apparatus of an intermediate apparatus between the electric motor and the drill, by means of which air or equivalent fluid, after being brought to a state of tension by the action of the motor, is caused to reciprocate the drill. Thus, in lieu of connecting the drilling-tool rigidly or directly to the movable element of the motor, the power of the motor is applied to the operation of the drill indirectly.

ROCK HISTORY—V.

THE study of paleontology or fossils is one of the most fascinating which relates to geology. That animals which lived, no one knows how many millions of years ago, should be preserved in the rocks, so that to-day we cannot only view them but can tell the relation which existed between the different families and trace the history of the progress of animal and vegetable life by them is wonderful indeed. To the proper understanding of this old life and its relation to the life of to-day our most eminent scientists have given their best thought, and to-day there is within the reach of almost every one who takes any interest in the subject ample means for pursuing this study. The geological reports of the various states give accurate cuts of the different fossils found within their borders, with sufficiently comprehensive descriptions. If one will take two or three good text books, what geological reports he can gather, and some two or three of Hugh Miller's books he will find enough to interest and instruct him for many months. No one who has ever really become interested in the study of any branch of geology is willing to abandon it.

Another curious study in connection with geology is what is known as ichnology. It is the study of the footprints and other marks of animal life of remote ages. In some of the rocks there are found few or no fossils. Were our knowledge of the life existing at the time of their formation dependent upon the fossil remains it would be meagre indeed. But there comes to our aid the science of ichnology, the foundations of which were laid by Dr. Duncan, of Scotland. This gentleman labored under the usual disadvantages of one who puts forth a new idea. He was scoffed and laughed at, but the truth of his ideas have long since been recognized. Of this science Hugh Miller says:

"The strange reptiles of this ancient time, in passing over the tide-uncovered beaches of the district, left their foot-steps imprinted in the yielding sand, and in this sand, no longer yielding, but hardened long ages ago into solid rock, the footsteps still remain. And with truly wonderful revelations,—revelations of things the most evanescent in themselves, and of incidents regarding which it might seem extravagant to expect that any record should remain, do we find these strange markings charged. They even tell us how the rains of that remote age decended, and how its winds blew."

At one time Mr. Miller went to visit a pond in the highlands which had become dry during the summer. There he found the same phenomena which marked the rocks of more ancient formations. A part of his description is given.

"What first struck me, in surveying the brown sun-baked bottom from the shore, was the manner in which it had cracked in the drying, into irregularly polygonal partings, and that the ripple-markings with which it was fretted extended along only a narrow border, where the water had been shallow enough to permit the winds or superficial currents to act on the soft clay beneath. As I descended, I found the surface between the partings indented with numerous well-marked tracks of the feet of men and animals, made while the clay was yet soft, and now fixed in it by the drying, process, like the mark of the stamp in an ancient brick. And some or these tracks were charged with little snatches of incident which they told in a style remarkably intelligible and clear. At one place, for instance, I found the footprints of some four or five sheep. They struck out towards the middle of the hollow, but turned upwards at a certain point, in an abrupt angle, towards the bank they had quitted, and the marks of increased speed became palpable. The prints, instead of being leisurely set down, so as to make impressions as sharp-edged as if they had been carved or modelled in the clay, were elongated by being thrown out backwards, and the strides were considerably longer than those in the downward line. And, bearing direct on the retreating footprints from the opposite bank, and also exhibiting signs of haste, I detected the track of a dog. The details of the incident thus recorded in the hardened mud were complete. The sheep had gone down into the hollow shortly after the retreat of the waters, and while it was yet soft; and the dog, either acting upon his own judgment, or on that of the shepherd, had driven them back. A little farther on I found the prints of a shoed foot of small size. They passed onwards across the hollow, the steps getting deeper and deeper as they went, until near the middle, where there were a few irregular steps, shorter, deeper, and more broken than any of the others; and then the marks of the small shoes altogether disappeared, and a small naked foot of corresponding size took their place, and formed a long line to the opposite bank. In this case, as in the other, the details of the incident were clear. Some urchin, in venturing across when the mud was yet soft and deep, after wading nearly half the way shod, had deemed it more prudent to wade the rest of it barefoot than to bemire his stockings. In each case the incident was recorded in peculiar characters; and to read such characters aright, when inscribed upon the rocks, forms part of the proper work of the ichnologist. His key, so far at least as mere incident is concerned, is the key of circumstantial evidence; and very curious events, as I have said,—events which one would scarce expect to find recorded in the strata of ancient systems,—does it at times serve to unlock."

It must have been in exactly this manner that the footprints of old extinct animals were made, and afterwards the mud became stone and the history of what happened ages ago is preserved for some keen eyed man to read to-day. Sir Roderick Murchison has described a slab of stone containing interesting prints.

"It is impressed by the footprints of some betailed batrachian (reptile), that went waddling along at its liesure, like the sheep in the nursery rhyme, 'trailing its tail behind it.' There is a double track of footprints on the slab—those of the right and left feet; in the middle between the two, lies the long groove formed by the tail—a groove continuous but slightly zig-zagged, to indicate the waddle. The creature half way in its course lay down to rest, having apparently not much to do, and its abdomen formed a slight hollow in the sand beneath. Again rising to its feet, it sprawled a little, and the hinder part of its body, in getting into motion, fretted the portion of the surface that furnished what we may term the fulcrum of the movement into two wave-like curves."

STONE should speak for itself to every intelligent man in the trade, and it does so speak. Hearken unto its voice, and subscribe for 1889!

SUCCESSFUL DESIGNING IN BUILDINGS.

Mr. H. H. Richardson, who was the architect of so many successful buildings, was not afraid of a blank wall space. Particularly was this true in the case of stone walls with quarry face. This was one of his qualities as a successful designer. The more ornamental parts of his work had something to rest upon. A beautiful window or door with a certain amount of plain space around it could hold its position of attractiveness and beauty with dignity, whereas if there were a conglomerate of panels, arches, buttresses and what not surrounding it, its beauty would be struggling for recognition from a confused mass. The details might be never so fine, and still there would be nothing distinctive about the principal features.

The third annual convention of the National Association of Builders will assemble at the hall of the Franklin Institute, Philadelphia on 12th inst.

IMPROVED METHODS OF BLASTING.

In nothing has the science of mine engineering made so great an advance within the last two years as in the means and methods employed to get coal with the least risk to human life. The several forms of apparatus for breaking down the coal after the "holing" has been performed leave but little to be desired, either in efficiency or in economy. But more startling has been the progress made with explosives suitable for this purpose. The water shield was the first step. But soon this protection was rendered unnecessary by the discovery of new forms of explosives which, detonating without flame, may be safely used even in an atmosphere laden with inflammable coal dust and vitiated by the presence of light carburetted hydrogen in a large proportion. This discovery was of the highest practical importance, because it avoided the complications involved in the use of the water-shield. Roburite and carbonite have each stood the test of exhaustive experiments and some practical experience in fiery mines.

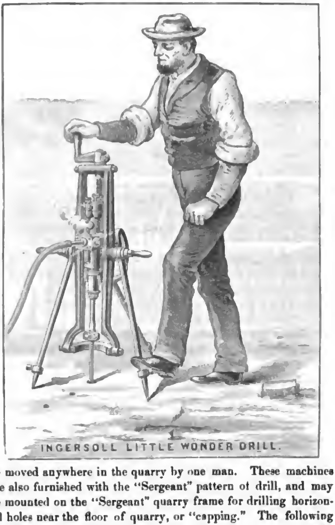
But a further and very important step has been taken in this direction. The subject has attracted the attention of scientific men both in Germany and in France, and the wider and more precise knowledge at which they have arrived has enabled us to make another move forward. Messrs. Mallard and Le Chatelier members of the commission appointed to examine the question, have reported to the Academie des Sciences some of the results of their inquiry. These results point to an easy solution of the problem which at one time seemed insoluble. Numerous experiments, they say, carried out at the gunpowder works of Sevyrn-Livry, have shown clearly that explosive substances fired in an atmosphere rendered dangerous by the presence of fire damp, ignite the latter only when their temperature of explosion exceeds 2,200 degrees Centigrade or thereabouts. The temperature of explosion of ordinary gunpowder is, according to Abel and Nobel's researches, about 2,231 degrees. Nitro glycerine gives, it is said, a temperature of 3,170 degrees, dynamite 2,940 degrees and cotton 2,636 degrees. Hence all these substances are capable of bringing about an explosion of fire damp. This is the discovery made.

Now for the application. If by adding other substances we can bring down the temperature of explosion to 2,000 degrees or less, we may use any of these well-known compounds with perfect safety. In this direction the commission has proved by a long series of experiments that the addition of an equal weight of either the carbonate or the sulphate of soda, to dynamite, renders the latter incapable of igniting a fiery atmosphère. Moreover, it has been found that the same result may be brought about by mixing a considerable quantity of finely powdered coal dust with the dynamite. To lessen the loss of force nitrate of ammonia may be added to nitro-glycerine or dynamite, the proportions recommended being twenty parts of the latter to eighty parts of the former. It thus appears that any compound may be rendered safe by the addition of suitable substances. We may therefore, restore to its former place of honor, the well-understood, safe-in-handling and cheap black blasting powder. Since its temperature of explosion is but little above the limit of safety, the addition of coal dust in a small proportion ought to be sufficient. This would be a cheap and easy way of obviating the danger. The matter is of such importance, that it deserves to be investigated at once. Doubtless, our leading manufacturers, who have a large interest at stake in this question, will promptly take it in hand. All mining men will rejoice at the prospect of being able to return to the use of gunpowder in blasting down coal.—*Geo. G. Andre, in The Colliery Guardian.*

The retail marble dealer who becomes a subscriber to STONE makes his largest commission.

IMPROVED QUARRYING MACHINERY.

THE illustration herewith shows the Ingersoll "Little Wonder Drill" for drilling plug and feather holes and block holes. This is the smallest power drill yet made, and is specially designed and adapted for the light drilling required in getting out dimension stone. This little machine embodies the principal and most valuable features of the Ingersoll "Eclipse" drill, such as the light, independent steam thrown valve, solid piston and chuck, cylinder buffers to protect the heads, etc., but is made much lighter and fitted to a special frame supported by a tripod which can be adjusted to drill holes at any angle from vertical to horizontal. The whole machine is light and compact, and can easily be moved anywhere in the quarry by one man. These machines are also furnished with the "Sergeant" pattern of drill, and may be mounted on the "Sergeant" quarry frame for drilling horizontal holes near the floor of quarry, or "capping." The following are some of the Indiana quarries where these machines are used: In hard limestone—Hollensbee Stone Co., New Point, Ind.; G. W. Layton, Lett's Corner, Ind. In oolitic stone—Tomlinson, Ried & Co., Bedford; Hoosier Stone Co., (4 drills, "Sergeant" pattern) Bedford; Indiana Oolitic Quarry Co., Stinesville; Romona Oolitic Stone Co., Romona, Ind.



INGERSOLL LITTLE WONDER DRILL.

For particulars and prices address Chas. W. Melcher, 615 North Fourth street, St. Louis.

"Mary Ann lies here at rest,
With her head on Abraham's breast;
It's very nice for Mary Ann,
But rather tough on Abraham." —*Boston Herald.*

A mortar which it is claimed will stand in all sorts of weather is made of one bushel of unslaked lime and three bushels of sharp sand, to which is added one pound of alum mixed with one pint of linseed oil. The alum will counteract the action of frost on the mortar.

GEOLOGY EXPLAINED IN THE SIMPLEST TERMS.

IT is not so difficult as you might suppose to read the contents of stones. Let us see.

Take three pieces of stone:

1. A piece of sandstone.
2. A piece of granite.
3. A piece of chalk.

You are quite familiar with each of these kinds of stone. Sandstone is a common material for walls, lintels, hearths, and flagstones. Granite may now be frequently seen in polished columns and slabs in public buildings, stores, and tombstones, and the streets in many large cities and towns are now paved with it. Common white chalk is well known to everybody.

Take the piece of sandstone in your hands and examine it carefully, using even a magnifying glass if the grains are minute. Then write down each of the characters you observe, one after another. You will of course pay little heed to the color, for sandstone, like books, may be red or white, green or yellow, or indeed of almost any color. Nor will you give much weight to the hardness or softness as an essential character, for you may find even in a small piece of the stone that one part is quite hard, while a neighboring piece is soft and crumbling.

If your piece of sandstone is well chosen for you, you will be able to write down the following characters:

1. The stone is made up of small grains.
2. The grains are all more or less rounded or worn.
3. By scraping the surface of the stone, these rounded grains can be separated from the stone, and when they lie in this loose state, they are seen to be mere grains of sand.
4. More careful examination of the stone shows that the grains tend to lie in lines, and that these lines run in a general way parallel with each other.
5. The grains differ from each other in size and in the mineral of which they are made. Most of them consist of a very hard substance like glass, some are perhaps small spangles of a material which glitters like silver, others are softer and of various colors. They lie touching each other in some sandstone, in others they are separated by a hard kind of cement, which binds them all into a solid stone. It is this cement which usually colors the sandstone, since it is often red or yellow, and sometimes green, brown, purple and even black.

Summing up these characters in a short definition, you might describe your sandstone as a stone composed of worn, rounded grains of various other stones arranged in layers.

Proceed now in the same way with the piece of granite. You find at once a different set of appearances, but after a little time you will be able to make out and to write down the following:

1. The stone contains no rounded grains.
2. It is composed of three different substances, each of which has a peculiar crystalline form. Thus one of these, called feldspar, lies in long, smooth-faced, sharply defined crystals of a pale flesh color or dull white, which you can with some difficulty scratch with the point of a knife. These are the long, white, sharp-edged objects that are easily seen. Another, termed mica, lies in bright, glistening plates, which you can easily scratch, and split up into thin, transparent leaves. If you compare these shining plates with the little silvery spangles in the sandstone, you will see that they are the same material. The third, named quartz, is a very hard, clear, glassy substance, on which your knife makes no impression, but which you may recognize as the same material out of which most of the grains of the sandstone are made.
3. The crystals in granite do not occur in any definite order, but are scattered at random through the whole of the stone.

Here are characters strikingly different from those of the sandstone. You might make out of them such a short definition as this: Granite is a stone composed of distinct crystals, not laid down in layers, but irregularly interlaced with each other.

Lastly go through the same process with your piece of chalk. At first sight this stone seems to have no distinct character at all. It is a soft, white, crumbling substance, soils your fingers when you touch it, and seems neither to have grains like the sandstone nor crystals like the granite. You will need to use a magnifying glass or even perhaps a microscope, to see what the real nature of chalk is. Take a fine brush and rub off a little chalk into a glass of clear water, then shake the water gently and let it stand for a while until you see a layer of sediment on the bottom. Pour off the water, and place a little of this sediment upon a piece of glass, and look at it under the microscope or magnifying glass. You will find it to have strongly marked characters, which might be set down thus:

1. The stone, though it seems to the eye much more uniform in its texture than either sandstone or granite, is made up of particles resembling each other in color and composition, but presenting a variety of forms.
2. It consists of minute shells, pieces of coral, fragments of sponges, and white particles, which are evidently the broken-down remains of shells, under a microscope which magnifies them fifty times. Large and well preserved shells, sea urchins and remains of sea creatures occur embedded in the chalk.

As a brief description of chalk, you might say that it is a stone formed out of the remains of once living animals.

You should repeat this kind of examination again and again, until you get quite familiar with the characters which have been written down here, and you will see why it is important for you to do so when you come afterward to find out that these three stones are examples of the three great groups into which most of the rocks of the world may be arranged. So that when you moisten the composition of a piece of sandstone, or chalk, or granite, and learn how each stone was formed, you not only do that, but lay a foundation of knowledge which will enable you to understand how by far the greater part of the stones of our mountains, valleys and sea shores came into existence.

In spite, then, of the apparently infinite diversity of the stones of which the globe is built up, you see that by a little study they may be grouped into very few classes. You have to follow a simple principle of classification, and each stone you may meet with falls naturally into its own proper group. You do not concern yourselves much with mere outer shape and line, but try to find out what the stone is made of, and ask whether it should be placed in the sandstone group, or in the granite group, or in the chalk group.

Sediment.—We take a glass of water and put some gravel into it. The gravel at once sinks to the bottom and remains there even though we stir the water briskly. We close the mouth of the glass and shake it up and down so as to mix the water and gravel thoroughly together; but as soon as we cease to do so and place the glass on the table again, we see that the gravel has sunk and formed a layer at the bottom. This layer is a *sediment of gravel.*

Instead of gravel, we put sand into the water and shake them up as before. We mix them so completely that for a moment or two after we cease, the water seems quite dirty. But in a few minutes the sand will have sunk to the bottom as a layer below the water. This layer is a *sediment of sand.*

We take a little mud or clay, instead of either the gravel or sand, and shake it up in the water until the two are thoroughly mixed. When the glass is replaced on the table this time, the water continues quite dirty. Even after some hours it remains still discolored, but we see a layer beginning to appear at the bottom. If the glass is allowed to stand long enough undisturbed, that layer will go on growing until the water has again become clear. In this case the layer is a *sediment of mud.*

Sediment, therefore, is something which after having been suspended in, or moved along by, water has settled down upon the bottom. The coarser and heavier the sediment, the quicker will it sink, while when it is very fine it may remain in suspension in the water for a long time.

Sedimentary rocks must thus be those which have been formed out of sediments. And just as sediments differ from each other in coarseness or fineness, so will the sedimentary rocks formed out of them.

Take three pieces of sedimentary rocks—a piece of *conglomerate*, or pudding stone, a piece of *sandstone*, and a piece of *shale*. Examine the first of these three pieces. You will find it to be made of rounded little stones, firmly cemented together. Were these round stones to be separated from each other, and gathered into a loose heap, you would call it a heap of gravel. The stone is evidently nothing more than a hardened gravel, such as you might pick up on the sea-shore or in the channel of a stream. It is sometimes called pudding stone, because the stones lie together somewhat like the fruit in a plum pudding.

Take up the piece of sandstone again, and make a further examination of it. Did you ever see anything like the grains of which it is made up? You reply that they are mere grains of sand, such as might be met anywhere. And you are quite correct. The sandstone consists of nothing else but sand firmly held together so as to form a stone. If you went down to the seashore, on to the bed of a brook, or river, you would gather sand of very much the same kind, and by hardening such sand into a compact mass, you might make sandstone.

In the third specimen you cannot so easily make out what the grains of the stone are, since their size is so small. But take a knife and scrape a little off the end of the stone and work it up with some drops of water; you will make a kind of paste in this way. Then put this paste into a tumbler of water and stir it well round. Immediately the water gets dirty-looking, and remains so even for some time afterward. But put the tumbler aside for some hours, and you will find that the water becomes clear again; that what you put in as a dirty paste has sunk to the bottom of the glass as a layer of sediment, and that it is simply mud. The shale, therefore, is nothing more than a stone formed of fine muddy sediment, just as the conglomerate is formed out of coarse gravelly sediment.

The term sedimentary rocks is a very expressive one, for it includes stones formed of all kinds of sediment, whether coarse or fine.—*The Manufacturer and Builder.*

George H. Harris of Fair Haven, Vt., is about to open a large slate vein in Beuson. The quarry is owned by Dr. H. R. Jones and John A Briggs. The slate is blue black, which is rarely seen among the slate regions, roofing slate of this color bringing a high price. Where the best slate sells for $3.50 per square, the blue black will bring from $4 to $5. Two hundred feet of holes will be drilled in the ledge, and the entire amount will be fired at one blast. If this quarry proves a success other quarries will be opened.—*Rutland Herald*

The annual meeting of the stockholders of the True Blue Marble Co., West Rutland, Vt., elected the old board of officers as follows: Directors, J. W. Cramton, George E. Royce, J. C. Dunn, Don C. Pollard, George B. Royce, Frank Huntress. President, J. W. Cramton; treasurer and manager, George E. Royce; secretary, George B. Royce; superintendent, George C. Underhill.

A MAGNIFICENT MAUSOLEUM.

A correspondent of the San Francisco *Chronicle* thus describes the tomb being erected to inclose the body of young Leland Stanford, who died a few years ago: The Stanfords have begun for their son a monument more enduring than brass, destined to perpetuate his name through ages and to be the noblest monument ever erected to any human being—a university with an endowment so princely that it amounts to more than the combined endowments of all other American universities. On the Palo Alto estate, rather more than half a mile from the site of the university, and slightly less than that distance from Governor Standford's residence, is the place selected by young Leland Stanford for his own residence. Excavation for the building began before his untimely death, and indications of the work then done are still apparent. The youth's desire to have his home on this spot was thwarted by the great Arbiter of his destiny, but his parents have most appropriately chosen the site for his last home on earth, and theirs, and they are now building there a tomb, the final closing of whose doors we hope may be long delayed.

The mausoleum was begun last June and will probably be finished with the winter. The architecture is of a hybrid order and its description might prove somewhat startling to an artistic purist. But its effect is imposing from its simple grandeur and meets with the approbation of common sense, however the canons of art might condemn it. At a glance, the building seems modeled after an Ionic temple.

From foundation to roof massiveness and simplicity are what chiefly attract one's attention. The foundation is of solid concrete—cement, sand and crushed stone—and for its construction 900 barrels of cement were employed. It is 50x30 feet and extends 15 feet below the surface. The mausoleum itself, as it rises from the ground, is 24x40:6 feet and 24 feet high, and the only materials used are Vermont granite and Italian marble. Around it runs a row of Ionic columns, while at each corner is a Romanesque pilaster. The granite doors are four feet six inches by eight feet two inches, with a bronze gate in front, approached by three steps and a small porch. These doors suggest Egyptian architecture, as do the sphinxes which stand guard at the entrance. Over the doors are cut in plain Roman letters the names of the three members of the Stanford family, and there is no other carving about the building. The smallest stone in the structure weighs more than a ton. The pediments, or gables, in common parlance, are each of one huge stone weighing twenty-five tons, while the enormous keystones weigh thirty-one and one-half tons each. The roof is composed of two granite slabs weighing thirty tons each and measuring 26x9:8x1 feet.

The interior is 15x22:3. On the end facing the door are to be three mural tablets, which are not yet in place. The interior is to be of marble exclusively, and no less simple or impressive than the exterior. The walls on all sides rise vertically to the height of ten feet and are then arched, the summit of the arch being eighteen feet from the floor. This marble lining is eight inches thick, and the arch alone weighs more than forty tons. There is to be no ornamentation whatever except panels and pilasters. The floor is of white marble tiles fifteen inches square.

Of the sarcophagi only one has arrived, while the other two are en route from Italy. Each is cut from a block of marble 8:6x5:6x4, weighs four tons and is to be lined with steel plates.

The vault is not much larger than a bedroom in one of our dwellings, and yet in its erection not less than $150,000 will have been expended. In the work two huge breast derricks are employed, running a five-inch rope, and with either derrick four men could move fifty tons; while each block in the tackle—there are 100 pairs of blocks—has a capacity of 65,000 pounds. Alexander Dallas of New York is the contractor.

HOW A MOUND WAS BUILT.

"WHILE exploring mounds in Ohio this season under the direction of the National Bureau of Ethnology," says Mr. Gerard Fowke in a paper prepared for *Science*, "I used great care in the examination of one mound in Pike county, in order to ascertain, if possible, the exact method of its construction.

"The mound was built upon the site of a house, which had probably been occupied by those whose skeletons were found. The roof had been supported by side-posts, and at intervals by additional inner posts. The outer posts were arranged in pairs a few inches apart, then an interval of about three feet, then two more, and so on. They were all about eight inches in diameter, and extended from two and a half to three feet into the ground, except one a few feet from the center, which went down fully five feet. All the holes were filled with the loose dark dirt which results from decay of wood. A few contained fragments of charcoal, burned bones or stone, but no ashes; nor was the surrounding earth at all burned.

"Around the outside a trench from three to four feet wide, and from eighteen to twenty inches deep, had been dug, to carry away the water which fell from the roof. Near the middle of this house, which measured about forty feet from side to side, a large fire had been kept burning for several hours, the ashes being removed from time to time. The ash-bed was elliptical in form, measuring about thirteen feet from east to west, and five from north to south. Under the center of it was a hole ten inches across and a foot deep, filled with clean white ashes, in which was a little charcoal, packed very hard. At the western end, on the south side (or farthest from the center of the house), was a mass of burned animal bones, ashes and charcoal. This was continuous with the ash-bed, though apparently not a part of it. The bones were in small pieces, and were, no doubt, the remains of a funeral feast or offering.

"After the fire died down, rude tools were used to dig a grave at the middle of the house. It measured ten feet in length, from east to west, by a little more than six in breadth. The sides were straight, slanting inward, with rounded corners. The bottom was nearly level, fourteen inches deep, but slightly lower at the centre. Over the bottom ashes had been thinly sprinkled, and on these a single thickness of bark had been laid. The sides had been lined with wood or bark from two to four inches thick. When this was done, two bodies were placed side by side in the grave, both extended at full length on the back, with heads directly west. One, judging from the bones and condition of the teeth, was a woman of considerable age. She was placed in the middle of the grave. Her right arm lay along the side, the left hand being under the pelvic bones of the other skeleton. This was apparently of a man not much, if any, past maturity. The right arm lay across the stomach, the left across the hips. This skeleton was five feet ten inches in length; the other, five feet four inches.

"The space between the first skeleton and the south side of the grave was covered with the ashes that had been removed from the fire. Beginning at the feet in a thin layer,—a mere streak,—they gradually increased in thickness toward the head, where they were fully six inches thick. The head was embedded in them. They extended to the end of the grave, reaching across its entire width, and coming almost but not quite in contact with the other head. A considerable amount of the burned bones lay in the southwestern corner of the grave, and the ashes along this part curved up over the side until they merged into what remained of the ash-bed. This had extended to the west slightly beyond the end of the grave.

"As the earth removed from the grave had been thrown out on every side, the bodies were in a hole that was nearly two feet deep. The next step was to cover them. There was no sign of bark, cloth, or any other protecting material above them. They were covered with a black sandy earth, which must have been brought from the creek not far distant. This was piled over them while wet, or at least damp enough to pack firmly, as it required the pick to loosen it, and, besides, was steeper on the sides than dry dirt would have been. It reached just beyond the grave on every side, and was about five and a half feet high, or as high as it could be conveniently piled.

"So far, all was plain enough: but now another question presented itself that puzzled me not a little; and that was, what became of the house? That there had been one, the arrangement of the numerous post-holes plainly showed; but the large earth-mound above the tumulus, or grave, was perfectly solid above the original surface, giving not the slightest evidence that the posts or any part of the house had ever reached up into it. I incline to the opinion that the great fire near the middle of the house had been made from the timbers composing it; that the upper timbers had been torn down, and the posts cut off at the surface, the whole being a kind of votive offering to the dead. At any rate, it is plain that a house stood there until the time the mound was built; and it was not there afterwards.

"For the purpose of covering the grave, sand was brought from a ridge a short distance away. There was no stratification, either horizontal or curving. Earth had been piled up, first around the black mass forming the grave-mound, and then different parties had deposited their loads at convenient places, until the mound assumed its final conical arrangement. The lenticular masses through almost the whole mound showed that the earth had been carried in skins or small baskets. The completed mound was thirteen feet high and about one hundred feet in diameter.

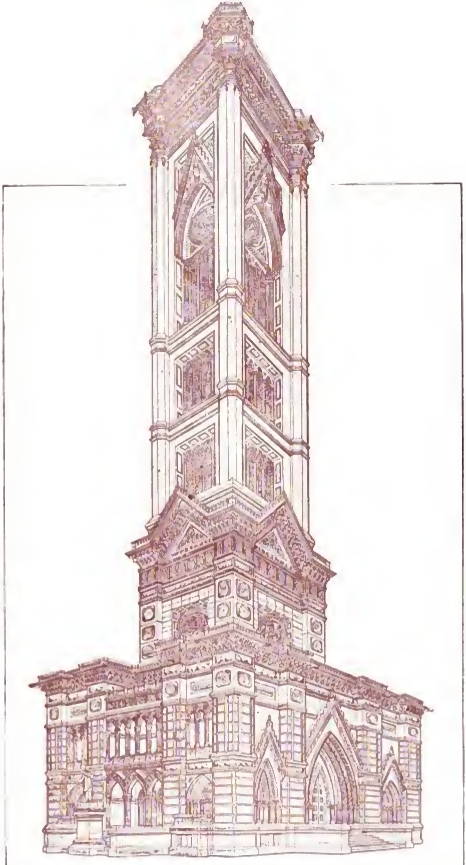
"Two and a half feet above the original surface was an extended skeleton, head west. It lay just east of the black earth over the grave. Sixteen feet south of the grave, on the original surface, and within the outer row of post-holes, were two skeletons extended, heads nearly west. It would seem that the flesh was removed before burial, as the bones were covered with a dull-red substance, which showed a waxy texture when worked with a knife-blade.

"No relics of any description were found with any of the skeletons; but a fine copper bracelet was picked up in a position that showed it was dropped accidentally."

"LONG JOHN" WENTWORTH'S BIG MONUMENT.

The 50-foot shaft designed to crown the pedestal of the Wentworth monument in Rose Hill Cemetery was safely lifted up to its place. The time taken to rear the great seventy-ton stone was two hours and forty minutes. This is the largest single stone, with one exception, and the lower base of the monument is the largest single stone ever quarried in the United States. All that now remains to be done is to take down and remove the derrick and cut away the small projection left in the shaft, where the ropes were made fast, and the prominent though plain monument will be complete. Occupying a commanding place in the cemetery, it can be seen at a considerable distance from any quarter. The distance from the apex to the earth is sixty-six feet six inches, and the total weight of the seven pieces making up the whole is 180 tons.—*Chicago Herald.*

A stock company, formed of Montpelier, Vt., business men, has purchased the entire large granite works and quarries known as the Whetmore & Morse Granite Co., at Barre, Vt., and are to remove the works to Montpelier and locate them on Barre street, where they are to employ about 150 men. About 50 men will also be employed at the quarries at Barre.—*Rutland Herald.*



DESIGN FOR A SOLDIERS·MONUMENT·AT·INDIANAPOLIS

O. H. Yeoman, Architect & [illegible], Urbana, Illinois.

CONTRACT NEWS.

New York.—

A normal school building will probably be built at Plattsburg. Cost, $100,000.

The Baptist society, of Cooperstown, will erect a church to cost $10,000.

Fred S Myers, 615 Broadway, New York City, will erect warehouse. Sharp & Smith, architects. Cost, $35,000. No contracts are let.

Green & Wicks, Buffalo, have prepared plans for residence to be built for Dr. Delancy, Rochester. Cost, $18,000.

Plans are wanted for a new building to be erected for the trustees of the Homeopathic Hospital, corner Maryland and Cottage streets, Buffalo.

L. M. Yondale, New York City will have erected two tenement houses near 7th Avenue, to cost $27,000. John E. Kirby, architect. No contracts let.

A Pfeiffer has plans prepared for a tenement building to be built for Michael Kirchner. Cost $12,000.

C. B. Sheldon, 158 7th-st., Brooklyn, has prepared plans for appartment house to be erected for himself. To be 50x75 and will cost $65,000. No contracts let.

Renta & Lange, New York, have prepared plans for handsome residence to be erected in Brooklyn for Adam Schulz. Cost 25,000. None of the contracts are let.

A C. White has prepared plans for eight residences to be erected in Brooklyn, for James C. Jewett. To be built of brick, with brownstone fronts. Cost $54,000.

Hugh Braly, New York City, has had plans prepared by Edw. Wenz, for flat and store buildings. Cost $80,000.

H. Clausen, Jr., 10 E. 78 street, New York City has had plans prepared for a handsome flat building. Cost $25,000.

Wm. Kuhles New York City has prepared plans for four flat and store buildings to beerected for H. Clausen Jr. Estimated cost $100,000.

Charles Downey, New York City, has had plans prepared by Architect Finkle for flat and store building, cost $18,000.

Theo. E. Thomson has prepared plans for five residences. Each 20x56 feet. Total cost $135,000.

J. H. Valentine, New York City, has prepared plans for four flat buildings to be erected for W. Bell, 502 E. 89th street, same place. Estimated cost $84,000.

Iowa.—

Daniel Pierce, of Sycamore, Ill., contemplates erecting an industrial school at Spirit Lake. Cost, $50,000.

The Methodists of South Burlington contemplate building a church. Cost, $20,000.

It is probable that a $50,000-Christian church will be erected at West Des Moines.

A Catholic school is to be erected at Petersburg.

Colorado.—

S. V. Farnum, Denver, will erect a $12,000 residence.

A business block will beerected by L. A. Watkins, Denver. Cost, $20,000.

Mrs. J. E. Fisher, Denver, will erect a $15,000-residence, corner Sherman and Colfax avenues.

Ohio.—

The German Reformed church, Canton, will erect a building to cost $10,000.

Wm Roberts, Lima, is having plans prepared for carriage factory, to be 50x100 feet, and to cost $10 000. None of the contracts have been let.

Ben. Evans, of Cincinnati, has prepared plans for a four-story flat building to be erected for Briggs Cunningham. It will cost $15,000, and none of the contracts have been let.

J. O. Ohler, Lima, will have erected, this coming summer, a large business block at that place. To be 100x120 feet and will cost $60,000. No contracts awarded.

The Lake Erie & Western R. R. Co. will erect three bridges on their line between Findlay, Ohio and LaFayette, Ind.

Illinois —

School Board of Geneseo will erect school house. Cost, $30,000.

R. G. Pentecost, Chicago, has prepared plans for a three-story residence to be erected for C. P. Packer. Cost $55,000.

Wilson, Marble & Lamson, Chicago, are preparing plans for stone front and basement residence to be erected on Drexel boulevard. Cost $16,000.

A three-story apartment building will be erected for John F. Barrett, Chicago, to cost $20,000. John Addison, architect.

Snyder & Quiner are preparing plans for a four-story machine shop to be erected for G. A. Crosby, Chicago. Cost $20,000.

Thiel & Lang have plans for a three-story flat building to be erected for E. H. Otto. To be 64x60, and will cost $10,000.

Pennsylvania.—

Details of the Bellefield Presbyterian church, to be erected at Pittsburgh, may be had by addressing Rev. Dr. W. J. Holland, of that place. Cost, about $45,000.

P. A. Welsh, 429 Walnut street, Philadelphia, is preparing plans for a magnificent church building to be built of brick, stone and granite, at Conshohocken. Details may be had of the architect.

H R. Jacobs will build a new theatre at Pittsburg. Cost $75,000.

A theatre isto be erected on Broad street, Philadelphia, for Israel Fleishman.

The Pennsylvania R. R. Co. contemplate erecting a bridge over the Ohio river near Pittsburg. Cost $1,000,000.

Georgia.—

The First Baptist Church of Americus will erect new edifice. Cost, $20,000.

VanWinkle Gin & Machine Co., Atlanta, has plans made for large new works. Cost, $70,000.

The Hebrews of Brunswick will build synagogue, 50x80 feet. Cost, $10,000.

Massachusetts.—

The Mystic Rubber Co., Staughton, is having plans prepared by H. J. Preston, Boston, for a large factory. Cost, $12,000. No contracts yet made.

Abbey & Schoeffel, Boston, will erect a handsome new theatre in that city. To be built of brick, granite and marble. Cost $75,000. No contracts as yet let.

The city of Lowell will build new school-house. Plans are wanted.

A new bridge over the Achusnet river, at Fairhaven is contemplated.

Michigan.—

The First Presbyterian society, Detroit, has had plans for church prepared Cost; $75,000. Mason & Rice, 80 Griswold street, architects. Alanson Sheley can be addressed for further particulars.

The First Presbyterians of Bay City, will erect a church building. Cost $50,000. Plans are wanted.

The Detroit College, Detroit, will erect a new building. Rev. Father J. P. Frieden, 353 Jefferson Ave., same city may be addressed for particulars. Estimated cost $60,000. Plans wanted.

A new building will be erected for the Women's Hospital and Foundlings' Home at Detroit. Mrs. James S. Roby can give particulars. Estimated cost $75,000.

A large bridge is to be built at Muskegon.

Missouri.—

The Breman bank directors will erect a new bank building on Broadway and Mallinckrodt streets, St. Louis. Cost, $16,000. No contracts let.

Plans are prepared for a new bank and office building to be erected for the Builders' and Traders' Exchange, of Kansas City. It is to be 50x94, and five stories high. Cost, $100,000. No contracts awarded.

Wisconsin.—

Plans have been prepared by Crane & Barkhausen, Milwaukee, for handsome residence to be erected for Fred Vogel, of same place. Cost, $25,000. No contracts have been let.

Details of an insane asylum, to be erected at Racine, may be had from N. Lytle or W. H. Jenks. Cost, $30,000.

New Jersey.—

Rev. Father M. J. Kirwan, of St. Mary's church, East Orange, is having plans made for a new stone edifice. Cost, $75,000.

Indiana.—

Joseph E. Mills, 31 State street, Detroit, has made plans for Trinity M. E. church, New Albany; 68x110, cost, $25,000. Address all communications to architect.

Alabama.—

Miller & Britt, Anniston, have made plans for residence. Cost, $25,000.

West Virginia.—

A $40,000-plant will be erected by the Steubenville Pottery Co., of Wheeling.

Kentucky.—

The Winchester National Bank will build three-story building.

Dakota.—

The United States will erect an Indian industrial school at Pierre. It will be three stories high, and cost $25,000. W. L. Wellman, same place, may be addressed in regard to it.

Canada—

James White can give details of a new court-house to be erected at Woodstock. Cost, $75,000.

Kansas.—

A $15,000 court-house is to be erected in Ravenna.

Arkansas.—

T. Hasting, architect, has plans for business block to be erected for Wolf Bros. & Foties Bros., Little Rock. Cost, $10,000.

Tennessee.—

The Citizen's Bank, of Dyersburg, will erect a new building. T. W. Jones or J. N. Parker will give particulars.

Wyoming Territory.—

The city of Cheyenne has appropriated 60,000 for the construction of viaducts.

PRICE CURRENT.

BLUESTONE.

(Lord & Griswold, Chicago.)

New York	45c
Wyoming Valley	45c

BLUE FLAG STONE—

(J. G. Barger, Goodyear's, Cayuga Co., N. Y.)

Prices f. o. b. Atwater, on L. V. R. R. and Cayuga Lake.

	Sq. ft.
Rough and Wavy Flag.	
2, 3 and 4-ft. size	5c
5 and 6 "	6c
Split Flagging.	
2 and 3-ft. size	6c
4 "	7c
5 and 6 "	8c
Smooth Split Flagging.	
2 and 3-ft. size	8c
4 "	9c
5 "	10c
6 and 7 "	11c
Solid Rock, per cubic foot	50c
Platforms, 4 in. thick.	Sq. ft.
Less than 25 sq. ft.	16c
25 and less than 40 sq. ft.	20c
40 " 50 "	25c
50 " 60 "	30c

Platforms containing more than 60 sq. ft., prices given on application. For platforms more than 4 in. thick, add 6c per inch for every inch over 4 inches up to 8 inches; over 8 inches thick prices given on application. Special advantages for furnishing large platforms.

For planing and jointing, per sq. ft.	25c
For planing, jointing and heading, per sq. ft.	30c

[Forest City Stone Co., Cleveland, O.]

(on cars at quarries.)

EUCLID BLUESTONE—

	cu. ft.
No. 1. Promiscuous block	45c
No. 2. Promiscuous block	.35
Crosswalk stone, broken to size but not jointed, 4 to 8 inches thick	.20
Gutter stone, 4 to 8 inches	.20
	Sup. ft.
Flagging—	
4 to 8 inches thick, natural bed, any size up to 12 ft. long	12c

EUCLID BLUE AND COLUMBIA SANDSTONE—

Sawed Flagging.

1 in. thick	10c
2 "	10c
2½ "	12c
3 "	14c
4 "	18c

BROWNSTONE—	cu. ft
Ohio—No. 1 Promiscuous blocks	60c
No. 2 " "	50c
Ashland, Wis.—Promiscuous blocks	60c
Connecticut—No. 1 " "	45c
No. 1 " "	65c

COLUMBIA BLUE SANDSTONE—

	Cu. ft.
No. 1. Promiscuous blocks	.40
No. 2. " "	.30c
No. 1. Monument Bases, broken to size	.45c
No. 2. " " " "	.35
Engine beds, broken to size	.40
Perch or Wall Stone, per ton railroad weight	.50c

SHODDY STONE—

Promiscuous sizes, per ton Railroad Co. weights	$5 00
Special sizes, per cubic foot	60

NORTH RIVER BLUESTONE—

(Union Bluestone Co., New York.)

Flagging	
Rough Flag, promiscuous sizes	$ 9
Smooth " " "	10
2 and 2 6 Smooth Flag, 1½ in. and over	12
3 " 3.6 " under 1½ in. thick	11
3 " 3 6 " 1½ in. and over	13
Cess Pool Flag, 2 to 2.6 in. square, 3 in. over	15
" " " 3 to 3.6 " " 3 in. over	17
4 ft. Rough dimension, 1 to 1½ in., 2 ft. and over wide	11
4 ft. Smooth dimension, 1¼ and under 1¾ in. 2 ft. and over wide, wide	13
4 and 4 6 in., smooth dimension, 1¾ in. and over	16
4 ft. N. Y. Corporation, jointed, 3 in.	23
5 ft. " " " 3 in.	25
5 and 5.6 Smooth Flag, 2 in. and over	17
5 and 5.5 " " under 2 in.	15
6 and 6.6 " " 2 in. and over 18.	18
6 and 6.6 " " under 2 in.	16
Well Stone, 3 to 3½ in. thick, 4 to 4.6 in. square	24
Well Stone 3 to 3½ " 5 to 5.8 "	28

Any of the above Flag ordered 3 inches thick, or extra requirements as to widths, subject to special price.

Large Flag	
6 ft. to 6.6, x 5 to 6 ft. wide	$ 22
7 ft. to 7.6, x 4 to 5 ft "	24
8 ft. to 8 6, x 4 to 6 ft "	28

The above to be 2½ inches thick.

Promiscuous Large Flag	
30 to 50 ft. 3 in. thick	28
50 to 70 "	38
70 to 80 "	50
80 to 100 "	78

Dimensions both ways add 10 per cent. Extra width and thickness at special prices.

For planing add 22 cents.

For rubbing add 35 cents.

Window Sills and Lintels.	
3 x 8 in. Quarry cut	22
4 x 8 in. " "	21
5 x 8 in. " "	29

¼ in. allowance in thickness.

Door Sills.

5 x 12 in. Quarry cut
5 x 14 in. " "
6 x 16 in. " "
} 3½ cts. per in. in width

8 to 10 ft. long, add 10 cts. per foot.

Curb, Quarry Cut.	
Thin Garden Curb	7
Cut " "	14
10 in. Curb	20
12 " under 4 in. thick	27
14 " under 4 in. "	28
14 " 4 in.	32
18 " bev'd, under 3½, 3 ft. and over, long	31
16 in. Curb, 3½ to 4, 4 ft. and over, long	33
18 " 3½ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	55
18 in. Corners, per set	5 50
20 " "	6 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.	
12 in. gutter, 3 to 3½ in.	17
12 in. " thin	14
14 in. " 3 to 3½, in. 3 ft. and over, long	21
14 in. " thin, 2.6 and over, long	18
18 in Belgian Bridge, 4 in. thick	44
20 in. " " 4 in thick	55
24 in. " " 4 to 4½ in	65
24 in. " " 5 to 6 in	77
24 in " " 7 to 8 in	90
19 in. Bridge Flag Joints, 3½ in.	28
20 in. " " " 3½ in.	40
24 in " " " 4 in.	50
Coping	
11 in Coping, 2 to 3 in.	28
14 " 2½ to 3 in.	29
15 " 2½ and under 3½ in.	40
18 " 3½ to 4 in.	45
18 " 3½ to 4 in.	50

20 in. to 36 in. Coping, 4 in. thick, 3½ cents per in. in width. When ordered over 4 in. thick, special price will be given.

When ordered under 4 in. thick, 3 cents per in. in width.

Steps.	
6 x 12 in. promiscuous lengths, under 8 ft.	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft. and up to 10 ft. long, add 10 cents per foot.

Rock.	
Promiscuous Rock, per in. in thickness	9
Dimension Rock, per in. in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 Inches Thick	
Under 20 feet	30
20 feet and under 35 feet	35
35 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price.

Above, if dimension both ways, add 10 per cent.

For 5 in. add 10 cts.
" 6 " 20
" 7 " 30
" 8 " 40
" 9 " 55
" 10 " 65
" 12 " 100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.	
4x8 in.	48
5x8 in.	50
5x9 in.	60
5x12 in.	77

¼ in. allowance in thickness.

Rubbed Lintels.	
3½ to 4 x 10½ in. under 8 ft.	48
8 ft. and under 10 ft.	60
4 in. x 13 in. under 8 ft. in length.	67
Rubbed Curb.	
2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in.	45
12 " " " 4 in.	55
Rubbed Mantels.	
4 x 10 in.	55
4 x 12 in.	65
4 x 14 in.	75

Dimension lengths with heads, measure heads.

Rubbed Hearths.	
3 to 3.6 in. long, 1.4 to 1.8 in. wide	28
Over 3.6 to 4 6 in. long, 1.4 to 2 ft. wide	33
" 4 6 to 5 6 " 1.4 to 2.6 in wide	40
" 5.6 to 6 6 " 1.4 to 3 ft. wide	45
" 6.6 and under 8 ft long, 2 to 4 ft. wide	85
Rubbed and Jointed Tile.—Boxed.	
Under 2½ in. thick, 12 to 30 in. square, per superficial ft.	55

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.	
3 ft. and 3 ft. 6 in., 1 ft. 6 in. and over wide	34
4 ft. and 4 ft. 6 in., 2 ft. wide and over	37
5 " 5 " 6 " 2 " "	39
6 " 6 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cemetery and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

Trade discounts on application.

BROWNSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, unless otherwise mentioned.]

			Cu. ft.	
Carbondale,	light	70c.	f. o. b.	quarry
"	dark	95	"	"
Hummelstown		45	"	"
Lake Superior	Marquette	1 00	"	Chicago
	Rain Drop	1 00	"	"
Trenton		50		
Linden		50		
New Brunswick		45		
Kibbie—Massachusetts		65		
New England Brownstone Co., Connecticut		.90c		
Chicago & Ind. "		.45c		

OHIO BROWNSTONE—

	Cu. ft.
Killbuck	45c
Gann	45c
No. 1. Promiscuous blocks	45c
No. 2. " "	.30

Stone ordered to dimension sizes 10 cents per cubic foot extra.

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

CONNECTICUT BROWNSTONE—

(Middlesex Quarry Co., Portland.)

	Cu. ft.
Blocks, promiscuous sizes	$ 95
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions	95
Blocks, Post, Lintels, etc., No. 2, 40 cu. ft. and over, price to be agreed upon.	
	Superficia
Door sills under 2 ft. wide, 8 in. thick, one edge under 7 ft. long, promiscuous sizes	63
Platforms, Cornice, etc., 7 to 8 in. thick, under 18 superficial feet	85
Platform, Cornice, etc., 18 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	1 13
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashlar, under 4 in. thick	30
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	40
Area Steps, 10 to 12 in. wide, under 5 ft. long, promiscuous lengths	50
Coping, 12 by 3 in. promiscuous lengths	63
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 7 and under 8 ft. long	95
Steps, Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 06
Steps, Lintels etc., 10 ft. long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu. ft.	1 50
" " 20 cu. ft. and over, price to be agreed upon	
Monumental Stone, 8 to 12 in. thick, charged 12 in.	
Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in. thick	56

Discount 5 per cent.; cash or approved Notes, at two months.

FREESTONE.

(Lord & Griswold, Chicago.)

New Brunswick brown	.45c
Buena Vista	.40
Ohio	.30
Long meadow, brown	.60

GRANITE.

(Lord & Griswold, Chicago.)

Westerly	
Monson	.65c
Woodstock	.65c
Mica Stone	.50c
Port Deposit	.65c
Leuthold Red, Monumental and Building stock	.65c to $1 00

GREEN STONE.

(Lord & Griswold, Chicago.)

Pennsylvania	.50c

LIME, CEMENT, ETC.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs.	$ 25
" " " new barrels per barrel	95
Newark plaster paris, or stucco, " "	2 25
Michigan " " " " " "	2 25
Louisville cement, " "	1 50
" " in paper sacks, per sack	50
Portland " imported, " barrel	3 75
White sand, (New Orleans) " "	3 00
Plastering hair, washed, in 1 bushel papers, per bushel	30
" " limed, " 1 " " " "	
Fire brick Savage per 100	
" " Aetna " "	4
" " Montezuma " "	3 50
" " West Virginia " "	3 00
Ground fire clay, best, per bushel	1 00
" " " common " "	

Discounts

Vitrified sewer pipe	.50 per cent.
Flue Pipe, for Chimneys	.25 " "
Terra Cotta Chimney Tops	.25

[Erie Lime and Cement Co., Erie, Pa.]

First quality ground limestone for glassmakers' use, $2.05 per ton, f.o.b. Erie.

LIMESTONE.

(Lord & Griswold, Chicago.)

	Cu. ft.	
Salem, oolitic	25c	f. o. b. quarry.
Bedford, oolitic, buff	25	" "
Stinesville, " blue	35	" "
Warrensburg, Mo.	25	" "
Stone City, Iowa	30	" "
Kasota	35	" "
Oolitic Bowling Green	25	" "
Artesian	35	" "
Grafton	35	" "

MAGNESIAN—

(J. A. Green, Stone City Iowa.)

Dimension Stone—(First Quality of all ordinary sizes.)

12 inches and over, per cubic foot	$	35
11 to 12 inches, per superficial foot		30
9 to 10 " " " "		27
7 to 8 " " " "		25
6 inches, per superficial foot		20
5 " " " "		17

Vault covers—(Large size.)

7 to 8 inches thick, per square foot	$	30
6 to 7 " " " " "		25

Flagging Stone—(Ordinary size.)

5 inches thick, per square foot	$	17
4 " " " " "		13
3 " " " " "		10

Bridge Stone.

Common, per cubic yard	$	3 50
Coppings, " " "		6 75
Pedestal Bases, per cubic yard		6 75

Footing Stone.

Dimensions, per cubic yard	$	3 25
Common, " " "		2 50

Rubble or Building Stone.

Common Rubble, Per 100 lbs	2½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	6

Street Crossings.

5 to 6 inches, per superficial foot	$	15
Curbing, 5 to 6 inches thick, per superfical ft.		15

Cut and Rubbed Stone—(Finished Ready to lay in their place.)

Ashlers per sq. ft. measuring all that shows	$	60
Base		70

Corner Blocks.

Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "
8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

(Lord & Griswold, Chicago.)

JOLIET	Rubble, $4 cord; dimension 30c
Planed sidewalk, Chicago	64c

ELLETTSVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Monumental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30		65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts, per superficial foot extra.

Rough Stone.

Mill Blocks as quarried, per cu. ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridge Stone, per cu. ft.	15c
Promiscuous good select Bridge Stone, cu. ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 2 per ct., on rough and dimension, and 5 per ct. on sawed.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	30c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	15
3 " " " "	13

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	22
Stone 9x6	21
Stone 9x5	19
Stone 8x8	22
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing.

10 to 12 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone,
$3 to $4.50 per cubic yard.

Rip-Rap.
$1 to $2.50 per car load.

MARBLE.

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial						Cu.
	1 in.	1¼ in.	1½ in	2 in.	3 in.	4 in.	Monumental
Statuary	90	1 15	Same as 2 inch	1 25	2 00	2 70	8 60
No. 1	75	90		1 10	1 65	2 20	7 00
Average	60	70		80	1 20	1 60	5 50
No. 2	40	45		60	90	1 20	4 80
Rutland Italian	30	35		55	82	1 10	4 25
Mottled Smith	----	----		40	60	80	3 50
Best No. 3	27	32		35	52	70	3 00
No. 3	20	32		28	27	50	2 00
Extra dark and mottled blue	40	50		60	90	1 20	4 50
Dark blue	30	36		50	75	1 00	3 50
Light blue	20	25		30	45	60	2 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in inches.	Diam. Bowl in inches.	Rutland Average. S. F. & M. V. Mount Dk.	R'l'd No. 2 ex. dk blue. Sutherland Falls No. 1. Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No. 2.	Rutland Best No. 3 Sutherland Falls No. 2	Rutland Light Blue. Suth'l'd F. Best No. 3 M. Dk. No. 3.
7	4	2 60	2 50	2 40	2 30	2 20
8	5	2 80	2 70	2 60	2 50	2 40
9	5	3 00	2 90	2 80	2 70	2 60
10	5	3 20	3 10	3 00	2 90	2 80
10	6	3 60	3 40	3 30	3 10	3 00
12	6	4 10	3 90	3 70	3 60	3 40
13	6	4 30	4 10	3 90	3 70	3 50
14	6	4 60	4 30	4 00	3 80	3 60
12	7	4 90	4 60	4 30	4 19	3 90
13	7	5 10	4 90	4 50	4 30	4 10
14	7	5 40	5 00	4 70	4 40	4 20
15	7	5 60	5 20	4 90	4 60	4 40
16	7	5 80	5 40	5 10	4 80	4 60
14	8	6 70	6 20	5 80	5 40	5 20
15	8	7 00	6 40	6 90	5 50	5 30
16	8	7 20	6 60	6 20	5 70	5 40
18	8	7 60	7 00	6 50	6 00	5 60
16	9	8 30	7 60	7 00	6 50	6 10
17	9	8 70	7 90	7 20	6 70	6 30
18	9	9 00	8 0	7 [illegible]	7 90	6 50
20	9	9 79	8 80	8 10	7 40	6 90
18	10	10 60	9 60	8 70	8 00	7 30
20	10	11 40	10 30	9 40	8 60	7 90
22	10	12 30	11 30	10 00	9 10	8 50
24	10	13 00	11 70	10 60	9 60	8 80
20	11	13 70	12 50	11 30	10 30	9 50
22	11	14 50	13 10	11 90	10 80	10 00
24	11	15 40	13 80	12 50	11 30	10 40
20	12	15 90	14 30	13 00	11 80	10 90
22	12	16 80	15 10	13 60	12 30	11 30
24	12	17 80	15 90	14 30	12 90	11 80
26	12	18 70	16 70	15 00	13 40	12 20
28	12	19 70	17 50	15 60	14 00	12 70
24	13	20 20	18 00	16 10	14 50	13 20
26	13	21 50	19 10	17 00	15 20	13 80
28	13	22 80	20 20	18 00	16 10	14 60
26	14	24 60	22 00	19 80	17 90	16 40
28	14	28 00	25 00	22 40	20 20	18 50
0	14	30 60	26 50	23 70	21 30	19 50

Hearths, 1 in., sawed edges, per sup. foot	$	20
No. 3 Base strips and posts, cubic foot		1 50
Inferior No. 3 posts and strips "		1 25
" No. 3 bottom bases "		1 25
" blue posts, strips and bottom bases		1 73

Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4 "	1 00
Footstones, 5 to 8 in., each	30
" sawed heads, each	33
" " sand rub and box	38

SUTHERLAND FALLS MARBLE—

1888	Superficial.						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental.
Mourning veins	50	62	69	85	1 25	1 70	5 00
No. 1	40	55	75	80	1 20	1 60	4 50
Average	35	45	55	60	90	1 20	3 50
No 2	25	30	35	40	60	80	2 75
Best No. 3	20	25	28	30	45	60	2 25
No. 3	18	22	22	25	37	50	2 00

No. 3 Base Strips and Posts, per cubic ft.	$1 50
Inferior No. 3, Posts and Strips, per cubic foot	1 25
Inferior No. 3 Bottom Bases	1 25
Markers 12 to 14 in. long, 3 inches thick each	35
do 12 to 14 " " 4 " " "	50
do 16 to 18 " " 3 " " "	75
do 16 to 18 " " 4 " " "	1 00
Footstones, 5 to 8 inches wide, 3 inches thick each	20
Footstones, sawed heads, each	22
Footstones, sawed heads, sand rub, and box, each	28
Hearths, 1 inch, sawed edges, per sup. ft.	20

ITALIAN MARBLE—

	Cu. ft.
Monumental stock	$4 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size.
¾ in slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubic foot.

MOUNTAIN DARK MARBLE—

1888	Superficial.					Cu.
	¾ in.	1¼ in.	2 in.	3 in.	4 in.	Monumental.
No. 1	50	70	1 00	1 50	2 00	5 90
Average	40	60	80	1 20	1 60	4 90
No 2	32	45	60	90	1 20	3 90
No. 3	22	30	45	68	90	2 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No. 3, Strips and Posts, per cu. ft.	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	25
do 10 to 14 " " 4 " " "	50
do 16 to 18 " " 3 " " "	75
do 16 to 18 " " 4 " " "	1 00

SPECIALS—

Dimiolshed Dies, extra per cubic foot	50c
Strips ordered 7 ft. long and over, extra per cubic foot.	50
Sawing edges slabs, 1 inch thick per superficial ft.	03
" " " 2 " " " "	06
" " " 3 " " " "	08
" " " 4 " " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock per cubic foot	20c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths per surface foot rubbed	05

POLISHING MATERIALS—

California Putty	per lb.	$0 75
Putty, first quality	"	65
" " " 25 lb. boxes	"	60
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	12
" " small lots,		15
Sponges, first qual. sheepswool	per lb.	1 50
Red Grit	"	03
Nova Scotia Blue Grit	"	03
Common Coarse Grit	"	02
Oxalic Acid	"	15
Sand	per bbl.	2 00
Cloth, 52 in. wide	per yd.	6 00

TOOLS—

½ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	2 00
Tools over ⅝ in.	per lb.	35
Frosting Tools	each	58
Drill Stock, iron pulley	"	6 00
Drill Bow String, Wire covered	"	35
" " Steel	"	1 50
Drills	per doz.	2 50

BEST HICKORY MALLETS—

2 to 3 lb	each,	$ 67
2½ to 4½ lb	"	1 00
5 lb	"	1 25
6 lb.	"	1 50
7 lb.	"	1 75
8 lb.	"	2 00

BRANCHES—

Boston Marble Co., 8 Thacher-st.
Philadelphia Marble Co., 201 South 30th-st.
Cleveland Marble Co., 179 Merwin-st.
Toledo Marble Co., 10 Lafayette-st.
Detroit Marble Co., 278 Woodbridge-st., West.
Chicago Marble Co., East End Michigan-st.
Vermont Marble Co., (St. Louis Branch) Cor. 11th and Spruce Sts.
San Francisco Branch (Vt. M. Co.) 244 Brannan St.

TRUE BLUE MARBLE—

[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial in. ⅞	1	1¼	1½	2	3	4	Monumental.
Dark Veined Blue	22	25	38	45	45			3 00
Dark Mottled Blue	30	35	40	55	55			4 00
Ex. Dk. Veined Blue	30	35	40	55	55			4 00
Ex. Dk. Mottled Blue	40	45	55	70	70			5 00

Dark blueposts, per cubic foot	$1 05
Dark blue, bottom bases per cubic foot	1 65
Rutland inferior No. 3 bottom bases per cubic foot	1 25
Dark blue markers, 0.10 to 1.2 long, 3 in. thick each	50
Dark blue markers, 0.10 to 1.2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 8 in wide, assorted sizes each.	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads sand rubbed and boxed, each	28
Diminished dies, extra cubic foot	50
Strips ordered 7 0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1½ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing per cubic foot.	35
Boxing " "	25

(Lord & Griswold, Chicago.)

Tennessee Red	$2 50@$3 50	f. o. b. Chicago
" Knoxville	3 00	" "
Vermont White	3 50@ 8 00	" "
Ophite	4 50@ 5 00	" "
Armodite	1 50	" "

GEORGIA MARBLE—

[The Blue Ridge Marble Company Cincinnati, O.]

Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$6 60	$6 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	3 85
Cherokee, selected	6 25	3 60
Cherokee, average	2 75	3 10
No. 3 base Strips and Posts.	1 60	1 95
Inferior No. 3 Posts and strips	1 25	1 70
Inferior No. 3 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	85
Markers, 16 to 16 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 3 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	23	30
Foot Stones, sawed heads, sand rubbed and boxed	25	38
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	50	50
Strips ordered, 9 feet long or over, extra	50	50

Urn list, sent on application.

ESPERANZA BLUE MARBLE.—

(Sargent & Murphy, Rutland, Vt.)

Extra dark veined	$4 50
Dark blue	3 50

MACHINERY.

CRAB WINCHES.

[Phœnix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting, Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	3,000 "	"	125 00

PORTABLE FORGES.

[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20	25.00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$50.00
" 0	" " " " with "	54.00
" 1	" 21x27, " 10 with hood	40.00

Discount 50 per cent.

[Star Machine Co., Buffalo, N. Y.]

No. 3,	Hearth 31-inch, fan 8 inches, with dash	$24 00
" 7	" 21x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	37 00

Discount 40 per cent.

QUARRY SUPPLIES.

BLOCKS AND TACKLE—

(Boston & Lockport Block Co., Boston.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron bushed	2 40	4 50	6 30
10 " "	3 30	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	5 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	29 00	48 00
20 " "	21 00	37 00	48 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 35	8 00	11 50
12 " "	6 00	10 50	15 00
14 " "	7 50	43 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	38 00	46 00
20 " "	25 00	45 00	60 00
Steel Tackle Blocks	Single	Double	Triple
5 inch	1 25	2 25	3 40
8 "	1 90	3 20	5 00
12 "	4 00	7 00	9 00
14 "	5 00	8 50	12 00

Iron-bushed, discount 20 per cent.; self-adjusting roller-bushed discount 20 per cent.

WIRE ROPE—

(A. Leschen & Sons Rope Co., St. Louis.)

	Discount	
Steel "Hercules"	42½	per ct.
Steel	42½	"
Gal. Iron	35	"
Iron	35	"
Wire Rope Blocks	35	"

(Washburn & Moen M'f'g. Co.)

Iron	35
Steel	42½
Gal. Iron	35

WHEELBARROWS—

(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	32 00

BLASTING MATERIAL.—

[For Customers of the Ingersoll Rock Drill Co. only]

Magneto-Electric Blasting Machine, No 3	$25.00
" " " (larger) No. 4	50.00

Discount 7½ per cent.

Platinum Fuses—Cotton Covered.

(50 in a bundle)

4 feet, wires	per 100 Fuses.	$3.00
6 " "	"	3.54
8 " "	"	4 08
10 " "	"	4 62
12 " "	"	5.16
14 " "	"	5.70
16 " "	"	6 24
18 " "	"	6 78
20 " "	"	7.32

Discount 10 per cent.

Fuses with longer wires at the rates of ½ of one cent, per foot, additional—a double cover being necessary for long fuses.

Leading Wire, Cotton Covered .... 1 c. per foot.

Discount 15 per cent.

Connecting Wire, Cotton Covered .... 40 c. per lb.

Discount 7½ per cent.

RED SANDSTONE.

(Lord & Griswold, Chicago)

[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu ft
Portage	60c
Dunreith, red	75c
" variegated	25c
Darlington	40
McArthur	65
Carlisle	65
Potomac	50

SANDSTONE.

(Cleveland Stone Co.)

[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft.
No. 1 Promiscuous block	50c
No. 2 " "	40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	40c
No. 2 " "	30
No. 1 Monument Bases, broken to size	45
No. 2 " " " "	35
Pier Blocks " "	20

SPLIT FLAGGING—

	Sq. ft.
3 inches thick, 6 feet long and under	07c
4 " " 6 " "	09c

SAWED STONE—

(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	25c
5 " " "	46
9 " " "	68
12 " " "	88
3 in. Berea or Blue Amherst	21
6 " " "	41
12 " " "	77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	10
2½ " "	12
3 " "	14
4 " "	18

SPLIT PLATFORMS—

	Superficial feet. 5in.	12 in.
No. 1 Buff Amherst	25c	60c
No. 2 " "	20c	50
No. 1 Berea or Blue Amherst,	20c	50
No. 2 " " "	17c	40
No. 3 " " " (for sidewalks)	16½c	30

Intermediate thicknesses proportionate rates.

BRIDGE STONE—

	Cu. ft.
Promiscuous Blocks	15c

Write for discounts, etc.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—

	Cu. ft.
No. 1	30c
No. 2	25

(Babbitt Sandstone Co., Ypsilanti, Mich.)

Brown Sandstone .... 25 f. o. b. quarry

(French Fort Quarry, New Castle, N. B.)

Light greenish sandstone No. 1	40c
" " No. 2	33½c
Railway Stone, cu. yd	4 50
Shoddy, 3 to 5 in. rise, sup. yd	1 60

(Lake Huron Stone Co., Detroit, Mich.)

Blue Sandstone .... 20c f. o. b.

SLATE.

[Henry Folmer, Easton, Pa.]
F. O. B. Slatington, Pa.

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 13 cents square foot in car lots.

ROOFING SLATE—

Size.	No. in sq.		Size.	No. in sq.	
14x24	98	$3 50	10x18	192	$3 70
13x24	106		9x18	214	
12x24	115		10x16	222	
12x22	127		9x16	247	
11x22	136		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

[Coolman & Westcott Fairhaven Vt.]

Vermont Milled Slate.

			Sup. foot
Mantel Stock			17
Fire Boards			17
Register Frames, jigged			24
Hearths			17
For rubbing both faces of above, excepting caps and trusses extra			02
Any of the above unrubbed less			01
Steps, to 5 ft. in length			20
Steps 5 ft. to 8 ft, "			25
Steps larger			special
Platforms to 16 sup. ft.			20
" 16 to 22 " "			25
" 22 to 28 " "			30
" Larger			special
Prices for steps and platforms includes one-face rubbed and one edge nosed or chamfered			
Urinal Slabs, squared and faced, sup. foot			22
Urinal Slabs, additional work	"	"	special
Laundry Tub Slabs, to shape but not grooved sup. ft.			22
Laundry Tub complete, set up, 2 compartments crated			$14 00
Laundry Tub complete, set up, 6 compartments, crated,			$19 00
Larger than standard compartments or more of them,			special
Wainscoting, sup ft.			20
Black Boards, ⅜ to ½ up to 3 ft. wide, crated sup. ft.			18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft			20
Black Boards, 3½ ft. to 4 ft. wide crated,	"	"	22
Thresholds to 5 ft in length	"	"	20
" 5 ft. to 8 ft. "	"	"	25
Curriers' Slabs, faced one side crated,	"	"	30
Curriers' Slabs, faced two sides, crated,	"	"	34
Billiard Table Beds, crated,	"	"	22
Imposing Stones,	"	"	30
Grave Covers, sawed and planed only, and in two or more pieces.	"	"	16
Grave Boxes, rabbeted ends,	"	"	20
Sills, Lintels, Watertables and other building work for each 1 inch in thickness,	"	"	14
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft.	"	"	20
16 to 22	"	"	25
22 to 28	"	"	30

Vermont Red	$13 50	f. o. b.	Chicago
" Purple	5 50	"	"
" Green	5 50	"	"

SEA GREEN—

(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x15, 15x20	2 65	"
8x16, 9x16, 10x16, 12x16, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont State Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b.	Chicago
Peach Bottom		"	"
Pennsylvania	5 75@6 75	"	"
Maine	5 50@5 80	"	"

BLACK—

(Michigan Slate Co., Lansing.)

Michigan .... $5 50 f. o. b. quarry

PURPLE ROOFING SLATE.—

(Hazard Slate Company Fair Haven, Vt.)

	First.	Second
24x12	$3 75	$2
22x11	3 75	2
22x12	3 50	2 5
22x14	6 85	2 25
20x12	3 85	2 25
20x10	6 85	2 25
18x12	3 50	2 25
18x10	3 50	2 25
18x 9	3 25	2 25
16x12	3 25	2 25
16x10	3 25	2 25
16x 9	3 00	2 25
16x 8	3 00	2 25
14x12	3 00	2 25
14x10	3 75	2 25
14x 9	2 75	2 22
14x 8	3 75	2 25
12x10	3 50	2 25
12x 9	2 50	2 25
12x 8	2 50	2 25

Mr. F. C Partridge, treasurer of the Vermont Marble Co., who has long been intending to make a trip to Europe, has availed himself of the opportunity offered at this time of the year by the periodical quietness in the marble trade to carry out his intentions in the direction named. He left by the Cunard steamer sailing from Boston recently, and after remaining in England for some time, will cross the channel to visit France before his return home. —*Rutland Herald.*

Any quarryman, stone, granite, or marble dealer or worker who subscribes for STONE for 1889 we guarantee will get tenfold value, or the subscription price will be refunded.

Barry & Maley Bros., have associated for the manufacture of all kinds of slate goods, at Fair Haven, Vt.

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"For Sale" ads. will be inserted at the low rate of one cent a word, each time. Terms, cash with order.

Workmen wanting situations, are requested to avail themselves of our columns to make their wants known. There will be no charge made for the service.

WANTED—Traveling salesman for Wholesale and Importing House. Address, stating experience, WHOLESALE, care STONE.

TO LEASE - An equipped granite quarry in Pennsylvania. Plenty of work. Address DR. GREENE, 178 Tremont-st., Boston, Mass.

WANTED—Monumental Draughtsman. Address, stating experience and salary. BURTON PRESTON, 2 Park Square, Boston, Mass.

WANTED -Situation—A reliable middle-aged man wishes a steady job to take charge of a business, light cutting, carving, and lettering, and thirty years' experience. Address CARVER, care of STONE.

WANTED—Situation as foreman on any kind of cut stone work, best of reference given. Address FOREMAN, this office.

WANTED—Traveling Salesman, in wholesale granite business; must be active, wide awake man; ability rather than experience necessary. Address with particulars, references and salary expected first four months. Good opening. E. C. WILLISON, 68 Boylston street, Boston, Mass.

WANTED—An experienced and competent man to travel and sell building stone, from a quarry equipped with machinery and mills for furnishing bills of stone in the rough or sawed to order. Address with references R. L. FOSBURGH, Commercial Building, St. Louis, Mo.

WANTED—A position as traveling salesman with a wholesale marble, stone or granite house. Am a practical man in the business, and have traveled extensively. During past three years have been soliciting for retailers. Address JOHN G. BLAMPIED, 21 Chestnut street, Albany, N. Y.

GOVERNMENT PROPOSALS.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 9th day of March, 1889, for the labor and materials required in the erection and completion of United States postoffice, court-house, etc., at TROY, N. Y. including Approaches, etc., (general excavation for building, and the heating apparatus not included) in accordance with the specification and drawings, copies of which may be seen at this office, the Office of the Superintendent, Master Builders' Exchange at Albany, N. Y., the Mechanics' and Traders' Exchange New York City, the Builders' Exchange Rochester, N. Y., and the Builders' and Traders' Exchange, Chicago, Ills.

Each bid must be accompanied by a certified check for $500.

The Supervising Architect will furnish a limited number of copies of the specification and drawings at five dollars a set, upon receipt of that sum in post-office money-order, drawn to the order of the Treasurer of the United States.

WILL A. FRERET,
Supervising Architect.

February 13th, 1889.

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BOSTON & LOCKPORT BLOCK CO.,
(Successors to Bagnall & Loud Block Co., Penfield Block Co.)
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—AND—
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"BUFF" and "BLUE."

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ARTISTIC SLATE MANTELS,
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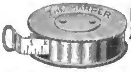

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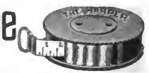

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Detroit Marble Co., 278 Woodbridge-st., West.
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CENTER RUTLAND,
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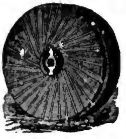

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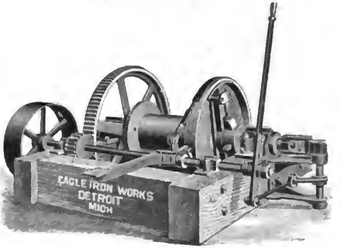

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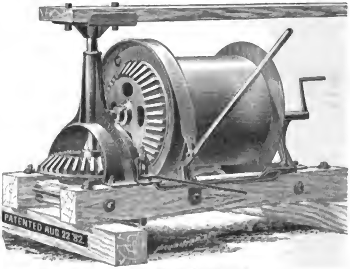
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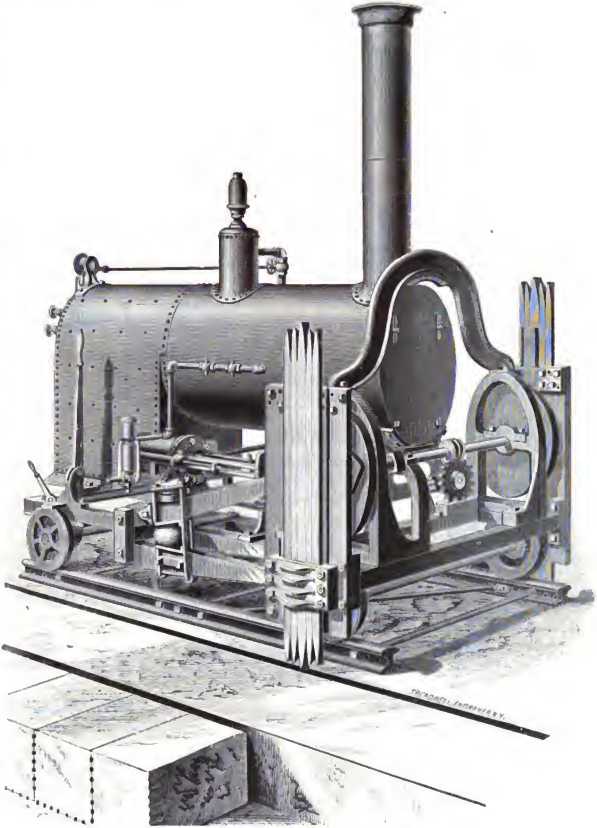

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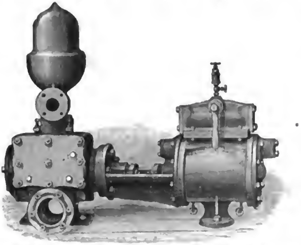

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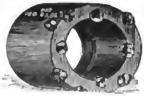

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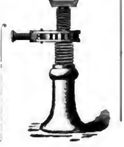

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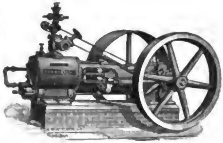

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PRIZE DESIGNS!

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WE HEREWITH SUBMIT THE PROGRAM FOR THE FIRST OF THIS SERIES:

The **First Design** of this series shall be for a Tablet (Tombstone) capable of construction in granite and marble, and shall contain, when finshed, not exceeding 30 cubic feet of material above grade.

All of these designs will be published in this journal at the option of the editor. Judgment will be passed upon the designs by three experts, viz.: Mr. J. F. Gookins, artist and art critic and student, The Academy, Munich; Mr. A. A. McKain, President of the National Association of Marble and Granite Dealers, and Louis H. Gibson, architect, a student from the Massachusetts Institute of Technology, Boston, Mass.

The Prize for the first design will be $40 in cash; the second best design in this competition, $10 in cash; the third and fourth will be mentioned in the order of their excellence.

The following drawings, and these only, will be furnished by each competitor:

One plan.

Two elevations.

One perspective.

The plan, elevations and perspective are to be drawn on a scale of three-quarters of an inch to the foot. The plan and elevation are to be placed upon one sheet of paper.

The drawings are to be made on two sheets of egg-shell or two-sheet bristol board 13x20 inches in size, surrounded by a single line for a border.

The plan and elevations are to be finished with India ink and drawing-pen. They are to be black lined and no shadows are to be cast. There is to be no brush work except to indicate the sections of the plan. The perspective is to be drawn in line only, without any background or foreground. Pen-and-ink shading will be permitted on the body of the tablet itself. It is particularly desired, however, that it be of a simple character, so as to admit of its proper reduction and reproduction by the ordinary processes of photo-engraving.

Any of the competitors may present more than one design.

Each drawing is to be distinguished by a motto or cipher. A sealed envelope bearing the motto or cipher is to contain the name and address of the competitor.

The drawings are to be delivered flat, between two pieces of strawboard, on or before the 20th day of March, 1889, to

THE D. H. RANCK PUB. CO.,
Indianapolis, Ind.

The experts will give a thorough examination of all drawings submitted, and forthwith select the best designs and report in time for publication in the April number of "STONE."

All designs will be returned to their owners, if required, after reproduction by photo-engraving.

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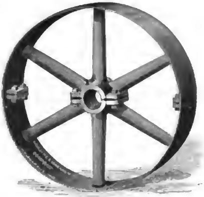

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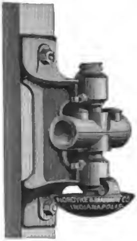

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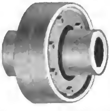

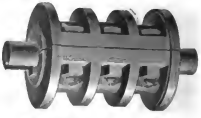

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·STONE·

VOL. I. INDIANAPOLIS IND. APRIL, 1889 NO. XII.

STONE.

A Journal for Producers, Workers and Users of Stone, Marble and Granite.

PUBLISHED MONTHLY BY

THE D. H. RANCK PUBLISHING CO.

(INCORPORATED.)

D. H. Ranck, Pres't and Treas. A. K. Hollowell, Vice-Pres't

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D. H. Ranck, - - - - Managing Editor.

L. H. Gibson, - - - - - - - - Editor.

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Readers of "STONE" who desire to purchase machinerry, or wish information concerning any class of machinery, not advertised in our pages, are invited to send particulars, and we will put them in the way of satisfying their wants without charge for the service.

The Associations.

Stone has been officially recognized and commended by the following Associations:

National Marble and Granite Manufacturers' and Dealers' Association of the United States and Canada

President—James Harsha, Circleville, O.

Vice Presidents—J. F. Brennan, Peterboro, N. H.; D. W. Paul, Frankfort, Ind.; Thos. Pitbladdo, New York N. Y.; Thos M. Stanliand, Dayton, O.

Secretary and Treasurer—H. D. Pierce, Chicago, Ill. (address care of Chicago Marble Co.)

The Retail and Wholesale Marble Dealers' Association of New England and the Provinces

President—Stephen Maslin, Hertford, Conn.

Vice Presidents—Maine, N F. Sawyer, Biddeford; New Hampshire, S. F. Foye, Dover; Vermont, Geo. C. Underhill, Rutland; Massachussetts, John Kelley, Weymouth; Rhode Island, R. G. Toye, Providence; Connecticut, C. D. Burnham, Hartford; The Provinces, James E. Stanton, St. John, N. B.

Secretary and Treasurer—William Hanley, Barre Plaine, Mass.

Marble and Granite Dealers' Association of Ohio.

President—James Harsha, Circleville, O.

Vice Presidents—A. J. Robertson, Sidney, O; Joseph Carabelli, Cleveland, O; C. M. Harsha, Hillsboro, O.; Roche Burrell, New Lexington, O.

Secretary and Treasurer—Homer M. Woodard, Columbus, O.

Marble and Granite Dealers' Association of Nebraska.

President—Chas. Neidhart, Brownville.

Vice Presidents—A. Heater, Lincoln; H. J. Mayer, Grand Island.

Secretary and Treasurer—A. H. Brown, Red Cloud.

Marble and Granite Manufacturers' Association of Brooklyn, N Y.

President—James Sharkey.

Secretary—William Vollmer

Treasurer—John Sutter.

IT is pretty safe to assume that the tariff on marhle will not be meddled with during the present administration and Proctor in the Cabinet.

THIS issue of Stone is delayed several days in mailing on account of the destruction of an important engraving just as it was ready to be printed. We were compelled to have another made. The excellence of this number, however, we believe will compensate any anxiety our friends may have experienced in not getting the journal on time.

WE call attention to our competition for a shaft. The designs for the tablet were very successful. After the exhibit that is here made we have no doubt but that even better results, numerically, may be expected from this second competition. We hope to add interest in the designing of various monumental details by means of these problems.

WE know a dealer who, if he sees a buyer come from a competitor's place of business will name a price low enough so that he will feel certain of getting the work. It is a habit of his to boast of the number of sales that he has spoiled for other people. While everybody is not as bold or as raw in matters of this kind there is a sneaking spirit not dissimilar to this running through a good many people. Now as a matter of fact if this thing could be organized the other way it would be better all around. If there were a tendency to help one another a little in the matter of sales there would be a good deal of money in the business. We know of establishments along another line which frequently have an understanding with reference to certain sales. One comes to another and says. "A. is working a deal with me on a certain price; I wish you would help me out on it." And so he does. Now this is much better than cut-throat competition. No one man can expect to get all the business. Any one who can succeed in getting a larger profit out of the business he is doing is in much better shape than if he increases his business and reduces the percentage of his profits. It is not the volume of business after all. It is the profit there is in it.

TIME sales are quite common in the monument business because people who want monuments can get time without paying for it. A few days ago we were talking to a monument dealer who had lately sold a fine piece of work to one of the wealthiest men in a prosperous state.

"Well, that was a cash sale, was it not."

"Not a bit of it," he said, "I have to wait until the first of the year for two-thirds of my money."

"How did that happen? Did you have an understanding of that kind when you made him a price?"

"No, I did not, I made him the price and he spoke of the time afterwards. I did not want to give it to him but I knew very well he could get it if he wanted it from another party, so I had to give it to him."

This is a plain case. The party who bought the monument got the use of two-thirds of its cost for nothing. He would have paid cash quick enough if he had been obliged to. There was no organization of monument builders in that state. Presumably such dealers will wait until business gets very dull and unprofitable, then spend two or three years of valuable time learning how to organize. Evils of this kind can only be corrected by organization. Ordinarily a sale of a monument would be for cash. If not that, there should be a positive charge for the use of the money. A monument is one of the things people ought to be able to pay for in cash if at all. Organization could regulate this as well as other matters.

OUR PRIZE COMPETITION FOR A TABLET.

IN response to the invitation to submit designs for a tablet for which we agreed to pay $40 for the first premium, $10 for a second, and to mention the third and fourth in the order of their excellence, we received thirteen designs. At first little interest was shown in the competition, and it was only after great efforts upon our part that attention was called to this competition. In the end it has been very successful. The number of designs received was ample, and they are of unusual merit. It has been our fortune to be interested in a number of competitions, but never before have we come in contact with designs where the proportion of really bad work was so small. The following is a list of the designs received in the order in which they were examined:

1. "FRENCH GOTHIC." This was a design for a monument, not a tablet, as required, and for that reason was ruled out.
2. "MALTESE CROSS."
3. "ESSAYEZ."
4. "DISCE MORI."
5. "BUD A."
6. "BUD B."
7. "CLIO L."
8. "CLIO G."
9. "CLAY."
10. "TRIPLE CRESCENT." This design ruled out on account of being for a sarcophagus, not a tablet.
11. "THE ONK-NONE."

The above designs came in before the time of the closing of the competition, 12 M. March 20. It will be remembered that the designs were to be submitted for judgment to Mr. J. F. Gookins, an artist, Mr. A. A. McKain, a monument builder, and Mr. Louis H. Gibson, architect. The designs were all received under motto, and until after the awards had been made, the author of none were known. After the packages were opened the envelopes containing the names of the designers were laid to one side and the drawings arranged around a large room. Each of the judges made an independent examination. No comments were made. After a time each made a note of his judgment on a sheet of paper. Mr. Gookins examined the ballots, and it was discovered that a choice had been made the first ballot, as follows:

"*Essayez*," first prize, $40 cash.

"*Clio G*," second prize, $10 cash.

"*Clay*," third mention.

"*Clio L*," fourth mention.

It may be interesting to state that the first prize design was made by John L. Wees, of St. Louis, Mo., the second prize by Chas. G. Blake, of Westerly, Rhode Island, the third mention by J. R. Gould, of Westerly, Rhode Island, and the fourth mention by Chas. G. Blake, of Westerly, Rhode Island.

The following is the report of the judges:

To the Publishers of STONE.

Gentlemen: We received and examined eleven designs for a tablet forwarded in response to an invitation published in your journal. We herewith submit detailed statement in regard to designs received.

"*French Gothic*" was not considered in awarding the prizes, for the reason that it was a design for a monument rather than a tablet, as required. The design, however, was pleasing, and showed the work of a skilled draughtsman. If the author had been more careful in reading the programme his skill as a designer would have no doubt brought him into more favorable consideration at this time.

Symbol, "*Maltese Cross.*" This design is commonplace. The drawing is exceedingly hard and the design crude.

The designs marked "*Essayez*" and "*Disce Mori*" are by the same author, Mr. John L. Wees, of St. Louis, Mo. To the design "*Essayez*" we awarded the first premium. "*Disce Mori*" is a much more ambitious design and far less successful. "*Essayez*" is cleverly conceived and brilliantly drawn. It has a pleasing outline. While the moldings are a little crude and the carvings somewhat undecided in its rendering, there can be no doubt as to this being the best design which came to hand. Its simplicity and refinement commands immediate and favorable attention. "*Disce Mori*" stands in uncomfortable contrast with its successful companion. While one is trim and decided the other is uncertain and mixed. However, both show the hand of a skilled draughtsman.

"*Bud.*" There are two designs by this author; both have the merit of being simple in outline. They show very little detail. If the designs had been more complicated they would have been less successful. However, when the outline is considered without reference to the surface detail there is something not at all unpleasant in the general conception. The rendering of the design and the lettering of the drawings show the work to be that of a draughtsman lacking skill and practice. His ideas, however, are good.

"*Clio*" submits two designs, one of which we marked "G" and the other "L" for the purpose of distinction. "G" is decidedly the best, it is a more straightforward piece of work. The drawing is good. The general design is vigorous. There is an indication of appreciation of good design. "L" is a more complicated piece of work and is correspondingly less successful. There are some very weak and some very good points about "*Clio L.*" The recessed panel with the narrow margins is badly handled. If the pointed top had been omitted results would have been much better. The molding at the base is common. However, the general effect of this design is good, but if considered with the objection which we have mentioned removed, it is easy to see that the result would have been much better. "*Clio G*" is awarded the second prize and "*Clio L*" the fourth mention.

"*Clay.*" This design has the merit of being simple. The drawing is carefully done, though it is somewhat stiff. The thing which gives it favorable consideration is its straightforward simplicity. While the design is commonplace it is along that line which is always successful. The front panel with the broken corners has the quality of detracting from the general success of the work. The molded top is very nicely handled.

Symbol "*Triple Crescent.*" This design was thrown out for the reason that it contemplated a sarcophagus rather than a tablet. Taking it as it is, it is a very successful piece of work. The design is original without being strange or unusual. It is rendered with a strong hand. It is altogether a very vigorous and successful piece of work. We regret that the author did not fully comprehend the problem.

"*The Onk-None.*" This is the old, complicated tombstone design. The moldings are unstudied, the details of the carving are common. It is probable that this design would cost more if placed in market than any which have come to hand in this competition. At the same time it is unsatisfactory.

J. F. GOOKINS,
A. A. MCKAIN, } Commission.
LOUIS H. GIBSON.

Since the competition closed two other designs have been received, one under a symbol of a "*Broken Shaft*" and another by "*Holland.*" The latter is a design for a sarcophagus and could not have been considered in the competition. The former, as a tablet, is a charming piece of work. It is strikingly original and exceedingly bright and clever. It is brilliantly rendered by a free hand; withal the conception is exceedingly simple. Altogether the design is very beautiful and it will give us great pleasure to publish it at an early day.

The design for a sarcophagus by "*Holland*" is a successful piece of work. The designer is not a novice. His drawing is exceedingly clever.

Altogether this competition is highly satisfactory, and we believe justifies the continuance of the scheme along other lines of work.

We have not had time to prepare an electrotype of the prize designs for this number, but they will appear in our next issue.

KAOLIN.

Kaolin is an extremely valuable article of commerce. It is a pure white clay, resulting from the decomposition of feldspar in granite rocks. It was originally found in China, but has since been discovered in France, Germany and England and Maine and Connecticut in this country. It is used in the manufacture of fine porcelain, and finds extensive use in smelters and glass-works.

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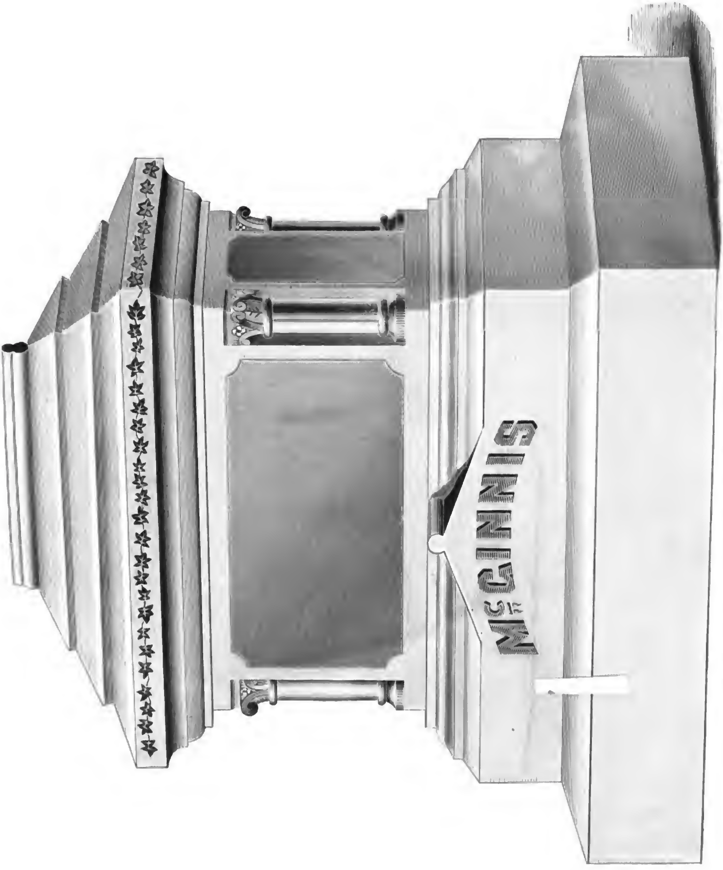

AND PRICES OF THIS DESIGN, APPLY TO BURTON PRESTON, MANUFACTURER AND IMPORTER, 2 PARK SQUARE, BOSTON, MASS.

HON. REDFIELD PROCTOR.

SECRETARY of War, Ex-Governor Redfield Proctor, was chairman of the Vermont delegation in the last Republican National Convention, and cast its vote from the first ballot to the last for General Harrison as the candidate for President. He was born at Proctorville, Vermont. a village in Cavendish township hich takes its name from his father, who combined the occupations of farmer, manufacturer and trader. He was well educated, and took his degree at Dartmouth College in 1851. He afterward took full course of study at the Albany Law School, and when the ar broke out was in practice with his cousin, Judge Isaac F. Redfield, in Boston. He enlisted in 1861 in the Third Vermont Regiment, and served for a me on the staff of Genral W. F. Smith. He ecame Major of the Fifth and afterward Colnel of the Fifteenth Regiment of Vermont, but after the battle of Gettysburg he returned home in broken health. For a time he lived on his farm, and while planning to return to the practice of his profession was appointed receiver of the Sutherland Falls Marble Company, which had become involved in litigation and was threatened with bankruptcy. He reorganized the business, reconciled the hostile interests, introduced improvements, and established one of the largest and most successful marble concerns in the country. After consolidation with its chief rival it became known as as the Vermont Marble Company, and in 1883 a combination was formed with other companies, and known as the Producers' Marble Company, which handled the product of the corporations forming the combination, and with the history and final collapse of which most of our readers are familiar. He is now at the head of the Vermont Marble Co., which but recently acquired extensive additions to its property, making it, perhaps, the largest enterprise in the world engaged in the production of marble.

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HON. REDFIELD PROCTOR.

The main office is at Proctor, and there are branches in different parts of the country. Mr. Proctor has acquired a large fortune. He has not allowed politics heretofore to interfere seriously with his business, but has taken a somewhat prominent part in management in his own state. He served in the State Senate and in the office of the Lieutenant-Governor, and was elected to the Governorship in 1880. His administration was popular, but he retired after one term. His business career has indicated large ability for administrative work. He is over six feet tall, and has a commanding presence, a sharp, shrewd face, and a voice noted for its power in political conventions.

WYOMING MARBLE.

THE *Platte Valley Lyre* of Saratoga, Wyoming, gives a short account of deposits of marble which are found in that region. We have often referred to the inexhaustible resources of our country. The quarries already developed give stone of all kinds in unlimited quantities. But on every hand we hear of resources totally undeveloped and but dimly realize the wealth which lies under our feet throughout the entire country.

The *Lyre* says: The marble deposit of the upper Platte region is at once extensive and splendid. This deposit is not confined to any one section or sections, but is found alike on Cedar creek in the extreme east of the Platte Valley, and the Savary section on the extreme west. In the Savary section the marble croppings are numerous, the prevailing white being diversified by a stone of the loveliest green tint. This green marble derives its hue from a copper presence, and is susceptible of the highest polish. TheSavary marble, both white and green, will force valuable commercial recognition in the near future.

But it is from the deposit of Cedar creek, or rather Saratoga itself, for Cedar creek is in the immediate Saratoga vicinity, that Platte Valley marble is to owe its future. This marble has all of the rare characteristics necessary for the chisel of the sculptor. It is veritable saccharine or statuary marble, is the color of loaf sugar, very fine grained, works freely in any direction, refuses to splinter beneath the chisel, and takes a high and ready polish. The Cedar creek deposit is incalculable in value. It occurs on the south side of Cedar creek, some five miles from Saratoga, and two miles from the ranch of E. E. Bernard. Here, at the base of a high and large hill, the marble shows up in a continuous cropping fifty feet long and eight feet wide, and then disappears into the bowels of the hill. What quarries are here, then, for the whole interior of the hill is doubtless a solid marble mass? That portion of the ledge in sight is of the most firm and substantial character. In this ledge Mr. Bernard has sunk a hole two feet deep, and finds that the deeper the ledge is penetrated the more solid grows the formation. This deposit is of a pure white marble which works readily and takes a fine polish.

The Upper Platte Valley is "traversed by lime deposits of three distinct and separate varieties: viz. limestone, shell lime and that singular earth forming that is known as "natural plaster." A description of this latter freak of nature is given elsewhere.

BUILDERS' EXCHANGES.

THE organization of a builders' exchange in any city has always been attended with great convenience. After the preliminaries of organization have been attended to a good room is selected, one centrally located, light and attractive. It is provided with boxes for the receipt of communications for the various members, and tables, desks, and writing paraphernalia are arranged for the convenience of those who make use of the room. Generally speaking one end of the room is raised, provided with a platform where are located the desks, etc., of the presiding officer who has charge of special meetings. For the most part the room is used during the day as a general meeting place and it is usually expected that most of the members will be at the room between 11 and 12 o'clock each day. Thus they come together informally for the interchange of business. They meet one another and examine any communications which may be received during any hours of the day. A carpenter may wish to see a bricklayer, one who supplies stone may wish to see a stone-cutter, or those who furnish material of any kind may wish to bring it to the attention of general contractors. They can come together in this way at 11 o'clock and do more business in half an hour than could be done in half a day driving about the city to the offices of those interested.

As an organization for the restraint of competition builders' exchanges have never been largely successful. They have corrected some abuses which have grown up in the trade. We have in mind instances in builders' exchanges where the greatest internal harmony does not prevail. However, their convenience as a meeting place has caused their survival. The influence of those who furnish material because of their numbers is sometimes greater than that of general contractors. The latter because of the quality of their position as the head of the building trade are more easily influenced by that which is for or against the general building interest. Therefore it sometimes happens that there is a lack of harmony orginating from this condition. Furthermore, there is a recommendation sent out by all builders' exchanges which suggests to owners of property that they let the various contracts such as cut-stone work, foundation, brick, painting, etc. separately and not in single contract as is frequently the case. While this emanates from all builders' exchanges it is a question in regard to which there is always a division but which is always ruled this way because of the sub-contractors being in the majority as compared with the general contractors, thus the sub-contractors prevail. The builders' exchange is essentially a strong organization and one which can and does do a great deal of good. The dignity and weight of such an organization adds to the individual strength of each member. It is in a position to correct abuses which apply to the individuals of such an organization which but for their unity in one large body could not hope to do anything but suffer. We have in mind one instance where an architect prepared plans and specifications for a large public structure. His drawings did not make it clear as to which portion of the walls of the upper structure were stone and which brick.

The builders' exchange of the city in which the building was located took up the matter and agreed that they could not figure upon the plans until the difficulty was remedied. While an individual builder, or any number of them, in a disorganized way could not have accomplished anything their dignified communication, coming as it did from a builders' exchange, meant a great deal. Any one who has stone to sell or any building material of that character can do no better than become a member of a builders' exchange of all of the cities in which they do a business. It brings their name constantly with all builders and associates them constantly with a body of men who use material. The fraternal and social element of a builders' exchange where men come together in this way is not to be underestimated. Men who are meeting one another all the time, who come together every day are more disposed to treat each other fairly than when their meeting or acquaintance is merely casual. The influence of personal contact is for good.

STONE PRICES AND COMPETITION.

WE met a gentleman who has made it his business to sell stone nearly all his life. He has taken a great many large contracts and nearly always has large work in hand. He is distinctively a salesman of a high type. He is a gentleman of education and general knowledge—an interesting person to meet under all circumstances. We said to him:

"Does an increase in the number of quarries and the developement of the country which brings new quarries into existence affect your business? Is competition any greater?"

He answered. "To be sure there are more quarries in the country than there used to be, and there is more stone used, and it is sold at a lower price. It is a question in my mind as to the exact relation of demand and supply. I am inclined to think that the product of quarries, or rather the productive capacity, has increased in a larger proportion than has the demands of the country. I say I am inclined to think this is true, though I am not sure of it. One thing is certain lower prices for stone have largely increased its use and through having to handle a large amount of stone the quarries are enabled to handle it cheaper. But as a matter of fact I am not disturbed by competition. If there weren't so many people on the road and in the market trying to sell stone there wouldn't be so much of it used. And as far as the effect on prices is concerned I am not disturbed by that. I believe that if a man will start out with the idea that he is going to have good prices for what he is going to sell he will get them. I know how it is in our business. If we send out a young man, or an inexperienced man, or an old one who doesn't know how to sell, that it takes months to get over the effect that such salesmen will have on the market of the territory that they cover. They are so easily influenced by what they hear. Of course it is true that the minute you stick a price at a buyer that he wants to get it cheaper. And if the salesman is in any way weak he will be influenced by what the buyer says. Then as soon as he weakens the buyer knows it. Now we have one price that we give to all our salesmen and they can't sell for any less, but it doesn't make any difference about that. If the salesman weakens he doesn't sell the goods, or he gets the buyer into a bad fix; he gets him to looking around for lower prices. After I follow up some new man or inexperienced salesman I have trouble selling goods with men who never questioned the prices before. It is true that people will pay anything for whatever they want. It is also true that nearly every one will lie about the prices at which he can buy from some one else. Just as soon as any one begins to talk to me about lower prices than I have to offer I show that I don't want to sell, and then it comes around in nice shape provided they want to buy at any price. And if I find it out one way or another that is all I want, that is all I have to do with that man. It is legs that sells goods. The salesman should stick to his prices and keep moving. No use to see people that you know are going to buy. If you know they are going to buy the chances are that some one else knows it, too. I say to our fellows: 'See those whom you know are not going to buy as well as the others. And if you don't sell maybe you will find out something. Keep moving.'"

[Written for Stone.]

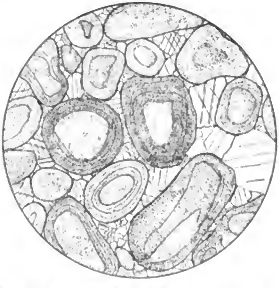
THE OOLITIC LIMESTONES.

GEORGE P. MERRILL.

THE name oolite as applied to limestones refers merely to their structure, or grain, the word being derived from the Greek word *oon*, an egg, in allusion to the resemblance of the small rounded granules to the roe, or eggs of a fish. This structure is not particularly marked in much of the Indiana oolite owing to the compactness of the stone, but it is very noticeable in those of Kentucky and some other states, as well as in the celebrated oolite of Bath, England.

The origin of this class of limestones is interesting and will repay our study. In order to illustrate this the more clearly I have drawn the figure from which the accompanying illustration was reproduced, and which shows how a thin slice of the stone appears when seen under a microscope and when magnified about 25 diameters. But before going on with a description of the stone it may be of interest to say a few words here regarding the method by which this thin slice was prepared.

The system of studying rocks in what are called *thin sections* and by the microscope is mainly a development of the past dozen years, and no one can now claim to have anything like a thorough knowledge of the subject who does not work by this method. The manner of preparing the so-called section is as follows:



A thin chip of the stone of about the size of the nickel five cent piece is knocked off with a hammer and on an iron plate by means of emery and water rubbed perfectly flat and smooth on one side. This chip is then cemented by means of Canada balsam, smooth side down, on a thick piece of glass an inch or so in diameter, or just large enough to be held readily with the thumb and fingers. Then turning the glass, chip side down, the rough side of the stone is carefully ground away in the same manner and on the same iron plate. The glass being transparent, the grinder is enabled to see just what is being done, and by working with sufficient care and with fine emery, an expert can readily reduce a chip of the hardest and most refractory rock to a thin film not over one four-hundredth or one six-hundredth of an inch in thickness, and of such transparency that the type of this paper can be read through it easily. This thin film is then carefully removed from the thick glass by a process unnecessary to describe here, and is placed upon a specially prepared slip of thin, colorless glass, and a square of still thinner glass is then cemented over it to protect it. This then forms what the geologist, or petrologist, calls a thin section, and, as every mineral has optical and crystallographic properties of its own, the schooled expert is enabled, by its study with properly prepared microscopes to learn much regarding its composition, origin, and in many cases to discover if it contains minerals that would be detrimental to the stone were it to be used for purposes of ornamentation or construction. From such a thin section this figure was drawn, and from its study we learn; first, that the stone is composed almost wholly of calcium carbonate, that is, is a limestone; second, that this calcium carbonate occurs in three different forms, (1) as minute angular particles which are evidently fragments of shells, (2) as concentric coatings, like those of an onion, around these shell fragments, and (3) in the form of minute colorless crystals of calcite which occupy the interstices of the rounded egg-like grains. These three forms will all, I think, be made apparent by reference to the figure.

Now, the main points to be learned from this are, simply, that away back in the days when the earth was comparatively young, the region now occupied by these oolitic limestones was an old seabottom, about and over which were tumbled the shells of dead mollusks, corals and crinoids until they were ground into fine sand, the particles of which are now represented by the irregularly rounded centers, or nuclei of the granules, and which are shown by the rounded finely dotted areas in the figure. But the sea water held in solution a certain amount of the calcium carbonate also, and it came to pass as the years went on that owing to the evaporation of this sea water this dissolved lime was deposited in the form of little pellicles, or coatings, around these fragments on the bottom, the gentle motion of the waves keeping the grains also in motion so that the coating was deposited not merely on top, but all over and around them, forming thus little rounded grains of loose shot-like sand. Finally movements in the earth's crust lifted the entire mass above the surface of the water, the little particles became closely compacted together, and the remaining lime in the sea water, or brought down from the upper portions of the bed by percolation, crystallized out as calcite, forming thus a cement to bind the grains together. This is shown by the irregular colorless areas in the figure and which are often crossed by straight dark lines.

Such, in brief, is the history of the oolitic limestones. Lest it should be thought that too much has been drawn on the imagination, I will say that in the inland seas of Utah and Nevada there are to-day forming beds of loose oolitic sand and loosely compacted stone just as I have described. The United States geologists have brought in samples of this, and visitors may any day see them in the National Museum at Washington. They may also see a loose oolitic limestone that has very recently been formed on the coast of Florida, and beautiful white little grains of oolitic sand, like homeopathic pellets, such as are still forming at the hot springs of Snake River Valley in Montana.

So characteristic is this oolitic structure of the rocks of certain geological horizons of Great Britain and Europe that the name *oolitic* was once, and is still at times used to designate the entire formation. This name has now, however, given way to the more fitting term of *Jurassic*, from the Jura mountains lying between France and Switzerland and where rocks of this age and character are prominently developed. It may perhaps be well to remark here that the larger part of the oolitic limestones of the United States, and in fact all of those that so far as known are sufficiently firm and compact for structural purposes, are of greater antiquity, geologically, than those of the countries just mentioned, outranking and lying even below the coal measures, and belonging to what are known as the subcarboniferous formations.

The oolitic limestones have long been favorites with the architect and builder, owing to the softness of their color and easy working qualities. As a rule, of a light yellowish or creamy tint, they are for less objectionable to the eye than is the glaring whiteness of the crystalline marbles, while their peculiar grain permits of their being worked at any angle with the bedding, and at a comparatively small cost. Although soft, they are not brittle, nor in all cases more porous nor liable to unfavorable chipping and scaling than are many crystalline and higher-priced stones.

The long celebrated Bath oolite comes from a belt of Jurassic limestone extending from the English Channel at Dorset, on the south, in a band of varying width northerly and easterly through Somersetshire, Gloucestershire, Oxfordshire, Northamptonshire and Lancastershire to the North Sea. Naturally the stone is not uniform throughout the entire area, but it is stated to be as a rule soft, and creamy white or yellowish in color. Not all varieties are distinctly oolitic, though in the little that has come to the American market this structure is very pronounced, even more so than in our own Kentucky stone, to be noticed later. The Bath stone was used in England as early as the thirteenth century, and though so soft when first quarried as to be cut with a saw, has nevertheless proven very durable. It is safe to say, however, that it is too soft and porous for exposed work in a climate like that of the eastern and northern United States. The stone is quarried mainly at Burford and Tainton, in Oxfordshire, and "along the range of the Somersetshire hills, at Stinchcombe, Minchinhampton near Stroud, Bathampton, and Bath Bayuton near Box, Chippenham, and Doulting. The stone is here largely worked by tunneling under ground, and is of a fine grain, compact, slightly shelly, and soft when first extracted, but afterwards hardens. In color it is nearly white, passing into yellow, and is capable of receiving sculpturings to a degree of sharpness, only surpassed by Caen stone." A chemical analysis of the stone from Box yielded: Carbonate of lime, 94.52 per cent.; carbonate of magnesia, 2.50 per cent.; oxides of iron and alumina, 1.20 per cent.; water and loss, 1.78 per cent., with a trace of bituminous matter.

The well known "Portland stone," from the isle of Portland, near Weymouth, is a more compact and less distinctly oolitic stone from the upper portions of these same formations. This stone has a less uniform texture, frequently containing fossil shells of such size as to render it unsuited for finely carved work. It has been used in England since as early as 1660, and was a favorite material with the celebrated architect, Sir Christopher Wren. These same Jurassic formations in Normandy, France, furnish the well-known Caen stone, a stone which on account of its color, texture and fine-working qualities, holds out to the architects and builders greater temptations for its use than almost any other material now quarried. Nevertheless it is not speaking too strongly to say that the stone ought, under no considerations, to be used for exposed work in our climate. It is porous, and cannot withstand the winter's frosts without serious weakening and disintegration. The oolitic structure is almost wholly lacking in this stone, but I have mentioned it here, inasmuch as its general appearance and working qualities are the same, and it is used for the same purposes. The stone is said to have been first introduced into England, shortly after the Norman conquest (1066), and to have been very generally used, particularly for cathedrals, down to the middle of the fifteenth century. Of late years it has once more come into prominence in England, and has been used sufficiently in our country to demonstrate its poor weathering qualities. The Portland stone has yielded on analysis: Carbonate of lime, 95.00 per cent.; carbonate of magnesia, 1.00 per cent., and silica, 1.00. The Caen stone yielded: Carbonate of lime 97.00 per cent., alumina and silica 1.70 per cent. Such analyses, however, aside from their interest as showing the striking similarity in composition of the stone from the various localities, possess very little value, as for all practical purpose more depends on structure and texture than actual composition.

Even were the English and French oolites in any way desirable in our climate, there would exist but little necessity for their importation, since we have an abundance of equally good material in our own country. The Bedford, Indiana, stone is so well and so favorably known that one almost hesitates to mention it in an article of this kind. Of a light buff color, even texture, sufficient compactness to be little affected by moisture, yet sufficiently soft to be readily cut and carved, it has made and sustains its favorable reputation against all competition. The stone occurs in thick beds and in inexhaustible quantities, and is to be found not only in St. Lawrence county, but also in the counties of Monroe, Jackson and Washington. There were also on exhibition at the Centennial, in Philadelphia, in 1876, some beautiful blocks of this material marked as from near Corydon, in Harrison county. I cannot learn that the stone is regularly quarried, but judging merely from appearances, it is one of the best in the state. The Bedford stone has been thoroughly tested, and the results are given in the eleventh report of the state geologist of Indiana, 1881.

Our oolites are not, however, confined to a single state. Iowa shows fine varieties from Marion, Grundy and Des Moines counties; Illinois, a very compact and beautiful variety from Jonesborough, in Union county; and Kentucky a fine series from Christian, Caldwell, Meade, Grayson and Todd counties. These Kentucky stones are at present wholly unknown in our general markets, and cities within a few hundred miles are supplied with granitic material brought from the coast of Maine or Massachusetts. It is difficult to account for this fact excepting on the grounds that the public fails to realize the qualities of their home product. Many of the stones are compact and semi-crystalline, though still showing plainly their oolitic structure. Such will prove practically non-absorbent, and hence well fitted for the exterior and exposed parts of a building, while the softer and more porous varieties can be utilized in the finely carved and more highly ornamented interiors.

With all the oolitic stones great care needs be exercised in the selection of the mortar or cement in which they are to be laid lest the joints stain and the face of the stone becomes streaked. Indeed, owing to their prevailing light colors, they cannot be used with any degree of satisfaction in cities where much soft coal is burned, as they shortly become stained and unsightly. In cities like Chicago and Cincinnati, it in only too many instances, makes little difference as to what color of stone is selected for building, since in the course of a short time they present the invariable stained and streaked appearance. The lighter the stone at the outset the greater the contrast and disfigurement. Architecture in such cities must seek for its effects in structural features rather than in color combinations, reliefs and shadows.

SALT, GEOLOGICALLY CONSIDERED.

IT is well known that in the country surrounding Saratoga, N. Y. are numerous salt wells which are very valuable. It may be of interest to know something regarding their probable formation. Salt is there found at an average depth of 1,000 feet. The following table of the thickness of the rock strata passed in sinking a well at Cuylersville will show the geological formation of the region:

Soil,	184	feet.
Hamilton shales,	286	"
Corniferous limestone,	140	"
Hydraulic lime and shales,	500	"
First salt stratum,	4	"
Shale,	3	"
Second salt stratum,	28	"
Total	1,145	feet.

The few facts collected in regard to the deposits of salt point to the theory that it resulted from the evaporation of sea water. It is possible that a basin of salt water may through some movement of the surface have become separated from the ocean, and by slow evaporation left the deposit. Or, the basin may not have been entirely separated from the sea but may have had a small channel which at high tide filled it with sufficient water to make up, wholly or in part, for the daily evaporation. In the latter case "the brine would increase in strength until precipitation of saline matter began, and the precipitation would continue as long as the daily supply of sea water lasted."

Then the ocean once more covered the country, the surface was depressed so as to admit of this, and limes and other stone were deposited above the salt until it lay hundreds of feet below the surface. In drilling for a salt well large cavities have been reported in several instances, to have been found in the rock. The following is from the report of the state geologist of New York:

"In the corniferous limestone, especially, fissures occur, into which the drill drops, necessitating an extension of the rope or screw sometimes as much as five or six feet before the "bit" touches bottom. The existence of these fissures is proved by the subsidence of the water which had previously filled the wells. At Clifton Springs such a crevice was struck one morning at forty feet below the surface in the corniferous limestone. Immediately the water which had previously filled the well disappeared and could be heard falling into the cavity below. About three-quarters of a mile southeast of there on a farm, known as the Beal-Hammond Place was a well which had for some time been dry. On the day mentioned the owner was engaged in removing the stone, which he intended using in the construction of a new well. Suspending his work for dinner he was surprised upon his return to find four feet of water in the well and the amount steadily increasing. The supply has continued permanent to the present time. There can be no reasonable doubt that the water from the first well found a fissure connecting with the other. At Mutonville, Ontario county, located upon the Hamilton shales, several never-failing springs within a radius of one hundred rods were dried by the sinking of a salt well which flowed constantly. At 1,000 feet deep this in turn struck a cavity, which drained it so that the water ceased flowing from the top. Similar well authenticated instances are reported from other sources."

Limestone is a formation in which cavities are readily formed by the action of water. All large caves are found in a lime formation in which the stone has been washed away by the water. Some of the best known instances are found in Mammoth cave of Kentucky and Wyandotte in Indiana. The whole region bordering on the Ohio river in Kentucky and Indiana is honeycombed with caves large and small.

MOSS MARBLE.

There has been discovered, four miles south of Rattlesnake Springs, Washington Territory, an extensive ledge of marble, in which beautiful trees or plants of moss are as frequent and as clearly defined as in the moss agate, though the marble is not translucent. The body of the stone is mostly white, with splotches of pink and blue between the bunches of moss.

STUDIED FROM LIFE.

Prof. Marble (examining the work of a modeling class)—Very good, Mr. Clay, especially the foot and ankle. Have you devoted much attention to modeling?

Mr. Clay—No, sir: I was formerly a conductor on a two-story Fifth-avenue stage.—*Puck.*

THE FOSSIL RAINDROPS.

Over the quarry the children went rambling,
 Hunting for stones to skip.
Into the clefts and the crevices scrambling,
 Searching the quarrymen's chip.

Sweet were their voices and gay was their laughter,
 That holiday afternoon,
One tumbled down and the rest tumbled after,
 All of them singing one tune.

Here was a stone would skip like a bubble,
 Once were it loosed from its place—
See what strange lines, all aslant, all a-trouble,
 Covered over its face.

Half for a moment their wonder is smitten,
 Nor divine they at all
That soft earth it was when those slant lines were written
 By the rain's gusty fall.

Nor guess they, while pausing to look at it plainly,
 The least in the world perplexed,
That the page which old Merlin studied vainly
 Had never such wizard text.

Only a stone o'er the placid pool throwing,
 Ah—But it told them, though,
How the rain was falling, the wind was blowing,
 Ten thousand years ago!

—*Harriet Prescott Spofford, in St. Nicholas for March.*

NEW ENGLAND MARBLE DEALERS.

The marble dealers of New England and the Provinces held their fifth annual meeting and dinner at the warerooms of the Boston Marble Co., 8 Thacher-st., on 21st ult., many leading representatives of the trade being present.

A substantial lunch was served from 12 until 4, and the health of Secretary of War, Redfield Proctor, a member of the association, who was detained at Washington, was drunk with hearty good will. These meetings are purely social and have done much to lubricate the wheels of trade. The business meeting was called to order at 2:30 o'clock by the president, Stephen Maslen, of Hartford, Conn., and it was voted to hold the annual meeting in July at Rutland, Vt., instead of at Springfield as previously decided. A cordial invitation was received from Hon. Redfield Proctor for the members to visit him at Washington, also from Sheldon Marble Co., of Rutland, to again make that city the place of their annual meeting. It was voted to send a telegram to the secretary of war congratulating him on his appointment to the cabinet. Thanks were extended to the Vermont Marble Co., by whom they had been entertained, and to J. D. Allan, manager of the Boston Marble Co. Among those present were:

O. Lavenseler, Wolfboro, Me.; J. F. Frisbie, Bridgton, Me.; Foye & Holmes, Providence. R. I.; J. F. Slater, Hopkinton; Eldredge & Adams, Rockville, Conn.; A. L. Goodwin, South Berwick, Me.; James Keely, Attleboro; G. E. Chase, Lawrence; W. E. Higbee, Proctor, Vt.; A. C. Kinney, Milford; R. L. Sands, Cambridge; Wall & Sullivan, Worcester; J. J. Love, Webster; H. Clark, Plymouth; ex-Mayor J. S. Treat, Portsmouth, N. H.; S. J. Nason, South Berwick, Me.; John Keeley, Weymouth; N. S. Noyes and J. Fyffe, Westerly, R. I.; Kennedy Bros., Quincy,; Watson & Gallagher, East Milton; C. F. Clark, Chelsea; N. F. Sawyer, Biddeford, Me.; Stephen Maslen, Hartford, Conn.; D. Harris, Marlboro; C. J. Rebiel, Providence; G. W. Leighton, Deering, Me.; and W. H. Webber, C. W. Furlong, C. O. Dudley, Richard Power, Henry Bacon, W. A. Snow, J. D. Allan, J. B. Macdonald, C. L. T. Stedman, O. M. Wentworth, S. W. Jones, R. H. Grover, F. L. Bailey, P. Breen, F. A. Griffin, W. E. Plummer, W. C. Taylor, David Maynes, C. E. Hall, D. W. Simpson, H. C. Millington, C. A. Tukey, Boston.

A MONUMENTAL INCIDENT.

ONE who has been instrumental in making a good many sales of expensive monumental work said: "I have overworked my point more than once. I have in mind an incident which happened several years ago. I had been out in the country and just closed a trade for a $1,200 monument, and was on my way to town to take the train home, and as we were about to pass a certain house the young man who was driving said: In there is a woman who has lots of money, and whose husband has just died, and who could afford to buy something pretty rich. I did something that I never had done before. I took a card out of my pocket and told her that I was just passing, and what my business was, and if she cared to talk to me I would be pleased to come in. I sent the card up by the boy; he went to the door, and after a short time came back and told me to go in. I went in and had quite a talk with her, and showed her some photographs and drawings that I had with me, but there was nothing there which just suited. I soon was able to see that I did not have anything that was quite good enough, nothing large or handsome enough. I told her that I would make a drawing of something, and that I would be going that way before long to put up the monument that I had sold and would come in and show her something which might suit. She was rather quiet in her manner, did not show much inclination to buy, except that she was willing to look. When I told her that I would make a drawing, she made some suggestions as to what she would like from what I had been showing her, and I felt when I left that I was in pretty good shape to get up a good design, or particularly one which would please her. I didn't wait for the other monument to be ready before I went back nor was I in too great a hurry. I took a pretty nice drawing down there of a very good granite monument. It had a good deal of stock in it, and altogether was a very nice affair. She looked at it quietly and said very little for some time. I didn't know what to think. She asked the price, and I made it $8,000, a good fair price for the monument. She didn't evince the least bit of surprise, but merely said: 'Will you leave the drawing with me for a few weeks?' Now, I didn't want to do that at all, but there was nothing for me to do but say that I would be pleased to do it. I then saw that she had no more use for me that day and left. She was one of the most demure little women that I ever met, exceedingly quiet, not in the least nervous, and entirely without emotion as far as I was able to judge. She was very attractive, of good figure, nice, quiet black eyes.

"After about three weeks I began to get a little restless. I was afraid some one else would get hold of the design and make her a little lower price and take the job. About that time she came walking into the shop one day. She had a piece of letter paper making suggestions of certain modifications in the design. She asked me if I would have a drawing made to show her how it would look. I told her that it would be done in two or three days. She said she would wait in the city until the work was done. I asked her where we should send it, and she said that she would call. She came around promptly, looked at what had been done, said that she liked that better, and asked if it would add anything to the cost. I said about a thousand dollars. She said she would consider the matter, and if I pleased would take both drawings with her. Of course they had to go.

"It was a month from that time before I heard anything more, and when I did it was an invitation to call at her home. She took out the drawing, suggested a few slight changes, and asked if they could be made, and I told her that they could. She told me she would take the monument at my price. I told her that if she would bring me a pen and some paper that I would draw up the contract. She didn't care anything for the contract, which fact disturbed me a little. I told her that we had better have a little memorandum, that it was more business-like, and would undoubtedly be more satisfactory in the end. So it was arranged that the work should be done for $9,000, and paid for in cash when completed.

"She was as cool as a wedge all the time, showing not the least feeling in the matter while I was a little bit disturbed. She hadn't offered me a less price than that which I had first made her. This fact made me suspicious. I thought that I would just go into the town where she lived and make a few quiet inquiries. I had an acquaintance there who told me that she was well-fixed, that her husband had died leaving her well provided for, and that I need have no anxiety in the matter. While we were talking a gentlemen came in and my friend introduced me to him stating that he had charge of the lady's affairs and could undoubtedly tell me more than any one else. I did not care to have it get to the lady that I was making inquiries in this way, and said that I didn't know that I had anything further to say in the matter. Her adviser remained in the room, however, until the other had departed. He asked me my business, and I handed him my card.

"Well," he said, "you have been selling the lady a monument, have you not?"

"I told him that I had."

"How much does she pay for it?" he asked.

"$9,000," I replied.

"$9,000! Why, my God, man, that will never do. There is a mortgage on her farm, her husband had only $12,000 life insurance and she hasn't got that yet. This will never do. She didn't say a word to me about that."

"I understood that she was quite wealthy."

"Well, you see, people don't always know about that. I tell you this thing won't do. Have you a contract with her?"

"I told him that I had."

"Well, now I tell you, man, this won't do. Her farm is mortgaged and if she were to get every dollar of her life insurance she would only have $3,000 left after buying the monument and there is some of it I am a little shaky about. Don't be in a hurry about that monument."

"I told him that I wouldn't, and finally told him that if everything proved to be just as he said, and if the lady wanted me to return the contract, that I would do it. He thanked me and I returned home pretty blue. In a short time the old Judge, for so he was known, and the lady came to my office in the city. She said in as quiet a way as before that she was not fully informed as to her financial condition, or did not understand it, and that the monument was probably more expensive than she ought to buy. I returned her the contract and the old Judge looked a good deal relieved. Then she said that if I had anything cheaper she believed she would look at that, that the Judge thought a thousand dollars was as high as she ought to go. I gave her the best we had in the shop for that money, and made the best of it."

INSCRIPTION NO. 2.

A few years ago a man brought a head stone bearing his wife's name into an office. It was that of his first wife. It laid around there for a few days and disappeared. He brought it back somewhat changed. He had lost his second wife some months before and had gone to the cemetery, taken the stone from the head of his first wife's grave, had her name cut out and in a recessed panel had the name of his second wife cut in. After this he placed it at the head of the new grave. This is a veritable instance.

Young Pat.—"What's a grave doubt, father?"

Old Pat.—"Bejabers, it's the uncertainty uv a man buried aloive whether he's dead or not!"—*N. Y. World.*

PRESIDENT JAMES HARSHA.

OUR readers, and more particularly those who are interested in and identified with the work of organization, will be pleased to look upon this excellent portrait of their steadfast friend, the earnest, tireless advocate, and honored officer—James Harsha, Esq., president of the National Association, and the Ohio Association of Marble and Granite Dealers.

Mr. Harsha was born in 1833; was apprenticed to the marble business in 1850; commenced business for himself in 1854, and followed it continuously ever since—most of the time at his present home, the city of Circleville, O. Mr. Harsha is the sort of man a sensible community always chooses for distinction—a man who is not forward in seeking prominence, but whose character as an honest man and a loyal citizen marks him as the proper person to intrust with public duties. Thus it is that he has been many times selected by his fellow citizens for offices of trust and honor. He has been the treasurer of the county of Pickaway, Ohio, two terms, a member of the council, and for fourteen years past a member of the board of education, of the city in which he resides. The same qualities that brought him recognition from his neighbors, impressed the marble and granite dealers of the nation and of his state, that he was fitted for the highest offices in their gift.

Mr. Harsha is blessed in his home life with a loving family, surrounded with those comforts which have rewarded his many years of earnest toil.

A genial gentleman—a man of the people—may his years be many yet, and full of peace and prosperity.

JAMES HARSHA.

TRADE ORGANIZATION.

TRADE organization is a subject which concerns all lines of manufacture and one receiving more or less attention from every one. The organization of those in trade is a matter of interest, because of its value to them. It is a matter of interest to the people at large because of their opposition to organizations of this kind. Therefore, it is a subject of large general interest. At this particular time there is more thought in these matters than a few years ago because there is more being done in the practice and study of organization matters. People generally are very inconsistent in affairs of this kind. A man who sells lumber and is in a lumber organization which seeks to control or restrain competition and thus enable him to get a fair price for his material feels highly disturbed at having to buy brick or stone from people who are similarly organized. Every man is essentially a monopolist as long as he has charge of the monopoly.

All other monoplies are deep sins. However, a trade organization, or a trust, or anything of that kind does not imply a monopoly. We use the expression at this time for illustrative purposes. The minute an association goes beyond the limits of reason in prices; from that time, dates the commencement of its downfall. The element of justice and right applies in all things. An organization which is oppressive and undertakes to do too much is sure to die. One that does right and seeks to receive only a fair profit for its product strengthens itself and harms no one.

One great mistake and one which has always been made by those who have undertaken to organize for protective purposes is that they have undertaken too much at once. The field of their operations has been too large considering their impatience to control it. We will take as an instance the organization of marble and granite dealers. They have undertaken to organize by state conventions including with their number not only the dealers of the state but those who have to sell supplies from the outside. This is a good plan for general purposes, but the dealers of the state alone should be first enrolled. In the state of Ohio they have succeeded measurably but only after a long struggle and a very great expenditure of energy. They would have succeeded better if they had first perfected an association of dealers in the state, and then engaged the assistance of the wholesalers in enforceing their laws.

The strongest and most successful organizations of business men in direct competition with each other can be built up on the district organization plan; that is, by those who are local competitors coming together and organizing in a local way. They thus become schooled in organization methods and after complete local organization are enabled to come together and organize as a large body in state and national organization. A state organization that is built up from many local organizations of that state is as solid as a rock. The members have passed through a kindergarten and other higher educational conditions which have developed an intelligence and knowledge of local and general trade affairs and a respect for the personal qualities of those with whom they have to do business which brings about the best results.

A California widow who gave $50,000 for a monument for her deceased husband, gratified her taste for something heavy in plan and figures, and when the lawyer got through fighting over and absorbing her estate, she sought and obtained a position as kitchen help, at $2 per week, from the man who designed the monument. With the $20,000 he built himself a nice home, and now her good taste in cooking and her ability to get around early, help to make the home attractive, even if it is not hers in fee simple.—*Ex.*

Bids are wanted for a $100,000-cathedral at Davenport, Iowa.

ON THE SELECTION OF BUILDING STONE.

WE reprint here a part of a communication to the commissioners of the capitol at Albany, New York, by Prof. James Hall, on the necessity for the careful selection of stone for building purposes. The fact that so many costly structures have gone into decay from the lack of care in the selection of the material used, should continually remind those interested of the necessity of such care. But the truth is there is perhaps no greater attention given to this subject than in years past. It is a great wrong to erect a costly building of a material which will last comparatively only a few years, when with proper care and attention it many be so erected that it will last for centuries.

In the selection of building stones for the exterior walls of a building, *color, texture and durability* are objects of the first importance; and all of these ought to be combined, to render the structure perfect. Too little attention has been given to the subject of building stones; while on the one hand we are largely using a brownstone, which gives a sombre, cheerless aspect to the structure, the opposite extreme has been sought in the white marble, or that which is more nearly white in color. In contrast with these we have the red glaring color of brick; and it is only partially that this offensive aspect is palliated by painting of neutral tints. In a few Eastern cities and towns we find the light gray granites now used in preference to the brown freestone, the white marble, or the dark granite, which have been much in use in past years.

No one can fail to experience the sensation of relief afforded by the structures, of light-colored granites in the city of Boston, or those of the buff or dove-colored limestone in the city of Chicago, or the light gray freestone of many buildings in Cleveland and other places and of the buff-colored brick of Milwaukee. In these cases we have not the excessive reflection of light, or the glare which comes from white buildings whether of marble or of painted brick; nor the sombre, cheerless expression of the darker stone, caused by its great absorption of light. It is only necessary to consider the effects produced by the structures of these different materials upon one's own sensation, in order to determine what are the most agreeable tints, or those which please the eye and produce a cheerful impression upon the mind.

In the majority of structures, the necessities of locality, cheapness, or other causes compel the erection of structures from materials most accessible; but these considerations are not imperative in the cases of an important public building.

In many cases where the rock is homogeneous throughout and the color uniform and satisfactory, it is only to be inquired whether the coloring material is such as will produce decay or disintegration of the particles. When the general color is produced by the aggregation of different materials of distinct coloration, the character of each one is to be considered, and its effect upon the whole; and it is important to have such material comparatively fine-grained, and the different parts as uniformly mingled together as possible. As a general rule, it is only in the darker stones that the coloring matter has any tendency to disintegrate the mass.

In the selection of building stones, the simple presentation of a sample is not enough. The rock in place should be examined in the outset; for in its natural outcrop it has been exposed to the action of the weather, in all its influences, for many thousands of years. One of the principles taught in elementary geology is that the soft and decomposing rocks appear in low rounded or flattened exposures, or entirely covered by the soil of their own debris, forming no conspicuous feature in the country; while on the contrary the harder rocks stand out in relief, producing marked and distinguishing features in the landscape. It not unfrequently happens that the geologist, having familiarized himself with the succession and character of the rocks of a particular locality or neighborhood, by seizing the features and character of the prominent beds, is able to trace them in succession along the escarpment or mountain range as far as the eye can reach, and to approach them from any distant point with assurance that he has not been deceived.

The strata which makes these features in the landscape are the ever-enduring rocks, which have withstood the action of the atmosphere through a period a thousand times longer than any structure of human origin. One cannot doubt that if properly placed in any artificial structure, they would still withstand the action of the elements. These escarpments, in their natural situation, may be coarse, rough and forbidding, more or less dilapidated or unequally dilapidated from the effect of time; but as they there present themselves, we shall be able to see their future in any structure exposed to the same influences.

It is true, however, that no artificial structure or position will ever subject the stone to the same degree of weathering influence to which it is exposed in its natural position, but the same changes in degree will supervene upon any freshly exposed surfaces. In its natural position the bed has been encased in ice, washed by currents, saturated with rains and melting snows, frozen and thawed, and exposed to the extreme of summer heat without mitigation. The rock which has withstood these influences is quite equal to withstand the exposures of a few centuries in an artificial structure. Yet there are occasionally modifying influences and conditions which have sometimes subdued the permanence of a durable stone, and given preference to others less durable. It therefore becomes necessary to carefully examine all these conditions, and to determine not only from the rock in place, but also from its physical constitution, whether it will meet the requirements of the structures proposed.

It not unfrequently happens, in working a quarry, that layers are reached which have not been exposed to the weather, and it is then necessary to test the strength and power of endurance of the stone. This may be done by repeated exposure to freezing and thawing, by testing the strength or power of resistance to pressure, etc. The exposure to freezing and thawing will not only determine its power of resisting the action of the weather, but will determine also whether such foreign ingredients as iron pyrites may exist in the mass. Chemical analysis may be resorted to for the purpose of comparison with specimens of known composition and durability; but chemical analysis alone cannot determine, without other testing experiments, the strength or power of endurance of the stone.

In some countries, and in certain localities in our country, the evidence obtained from ancient structures is available in determining the durability of the stone which has been used. Yet it would seem that this information has been of little avail in many places, where the rebuilding of edifices is repeated every century. Experience in many cases does not teach the lesson anticipated; and when a dilapidated structure is pointed out, the argument is made that "these stones were not well selected," or they were obtained "at the first opening of the quarry, and were not as good as now furnished." And again, as already remarked, there are few cases in which parties are permitted to select the material without prejudice, the influence of interest, or the absence of important information. Examples are everywhere before us of the improper selection of materials for buildings, and these examples do not deter from their use in the erection of others. When good material is abundant and accessible, it will be used; in other situations, comparatively few durable structures are likely to be erected.

"WE think your paper a very good one. It is a journal that all retail dealers should have, as well as the wholesale."—*R. C. Bowers Granite Co., Montpelier, Vt.*

NEW LIEN LAWS.

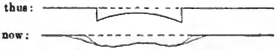
SEVERAL of the states have during recent years changed their lien laws. During the last session of the legislature the Indiana law was changed so that there are relatively no restrictions in the matter of taking a lien. Formerly it was necessary for those having claims against the property owner to give him notice that he would hold the owner liable for the cost and value of material to be furnished by him. Now this is not necessary. Any one can file a lien at any time within sixty days of furnishing the material or labor on a building or other structure without having given notice. This has been the general tendency of changing lien laws. They have been made more liberal from the standpoint of those who have furnished material or labor. The law, as it stood before, with proper interpretation worked no injustice. If the owner was to be held responsible for the value of material and labor furnished, he knew it. A verbal notice was regarded as sufficient. Now a building may be finished and settlement made, and the owner find to his sorrow and loss that liens have been filed, and that he has to pay twice for part of the material and labor. This is exactly wrong. There is no justice in it primarily, and in the second place it has the quality of bringing a certain class of low-grade or dishonest contractors into competition with those who have credit and are disposed to do the right thing under all circumstances.

We say that the law, as now framed, admits of and brings about a ruinous cut-throat competition, in that the low-grade class is in a position to buy material and secure labor which otherwise it could not get. Since this law changed more than one party who furnishes material to builders and workers in stone and others has said to us that now they can sell goods to any one and be sure of getting their money. One party said: "If a man comes into my place to buy material I ask him where it goes, make a note of the fact, and after it has been delivered, in due time send my collector around, and if he does not get the money promptly, I instruct him to go to the court-house and file a lien invariably. I tell him to say nothing to me about it, but to go and file the lien. Then the owner has to come down."

It is said that this will make the owners more careful. This is hardly true. It may make them careful, but there is the inducement of lower prices offered by low-grade men, and then people are not building all the time and cannot keep posted as to the best thing to do, or as to the records of all contractors. Any one who has had experience with building business knows that prices rule lower when there is a lien law which is liberal to those who furnish material and labor, and that the more reputable contractors are the greatest sufferers on account of having to meet a class of competition which is altogether direputable. The intentions of these contractors without credit may not necessarily be bad, but they almost invariably get into trouble for the reason that they figure too close and without charging sufficient margin for incidentals and profit. When they are out of money, when the contract price is exhausted, then the trouble begins. The owner is inclined to credit such contractors with general dishonesty, which, however, is not altogether in reason. However, there are always, in every community, a certain proportion of smooth-talking fellows who are ready to take a contract at any price with a view of making a living out of it as long as there is money in sight. Say that they take a contract which it takes three months to complete. The chances are that they will have the building money to draw on for at least two months by diverting the money from its proper channels for personal uses. This makes trouble in the end for the contractor of this class, but it counts for nothing. In a large community he is generally in a comfortable condition, as far as he and family are concerned. A lien law makes it possible for men of this character to thrive. They bear the building market, keep prices low and make trouble generally, in that it gives credit to these ignorant or disreputable people.

EFFECTS OF CLIMATE ON STONE.

PROF. J. L. LESLEY, of Philadelphia, in writing upon the influences of climate upon stone suggests that we must know what a given climatic influence has been upon a stone before we can institute comparisons as to the durability of that stone in another locality. "One of the two obelisks erected by Thothmes III, at Heliopolis fifteen or sixteen centuries before Christ, was transferred to Alexandria and is known as Cleopatra's Needle. It is of syenite, so streaked with hornblende, obliquely, as to suggest original stratification. Along these streaks, which are of irregular width, atmospheric erosion has taken place, by the ejection of one group of crystals after another, upon the melting away of the felspathic element. The whole face of the stone has suffered from the same action, but generally to a less degree, than at these exceptional places. Especially all the sharp cut edges have been rounded off. Wherever the solar disc, for instance, occurs, there is now nothing but unsightly hollows, where originally has been cut a sharp clear circle, with a vertical wall around a central convex tympanum.



"All the hieroglyphs from pyramidion to base have suffered in this way. Some are almost indistinguishable, except in the very best slanting light of the sun. One or two of the four faces also have suffered more than the others, showing that the prevailing winds have determined the degree of erosion. The climates of Cairo and Alexandria are so different from one another, the former so constantly dry and the other so uninterruptedly wet, that we have a right to ascribe the most of this destruction to the sea air since the removal of the obelisk from its original to its present site. But all the monuments of Egypt, at least up to the first cataract, show marks of atmospheric erosion, in spite of the assertion often repeated by travelers, that they are as fresh and their lines as sharp as when the chisel cut them. This is not true of any monument in the open air; but is approximately true of the intaglios in the tombs. Many of the monuments of the middle and classic empires are built of such inferior kind of stone, the only wonder is that they have not tumbled into ruin themselves, through the slow wear and tear of the surface, by the atmosphere. And yet Egypt is one of the driest parts of the world. It must be remembered, however, that the stratum of air, which lies at night upon the broad bottom of the valley, is charged with the exhalations of the river, canals and irrigated fields, and in this stratum the monuments stand. When the sun rises this moist air-mass is broken up and carried over the mountain walls into the desert."

Capt. E. R. Morse, who has been appointed private secretary to Secretary of War Proctor, graduated from Cornell University in 1879, and until recently has been actively engaged with the Vermont Marble Co. He is also a member of the bar and holds a commission in the National Guard of the State of Vermont.

This is a journal for producers, workers and users of stone, marble and granite, and no one has yet had the hardihood to say it isn't a creditable one. Now is the time to subscribe.

CORRESPONDENCE.

We would like to receive Correspondence of a newsy, or practical character from every section. Particularly do we want practical workers in the different stone trades to understand that this is the place where they may exchange ideas with each other; where they can seek information and find it; where they can set before their fellow workmen kinks and novelties which they are willing should become public property.

Let everybody make use of this privilege to commune with each other. If you feel that you cannot "write for your paper," you can at least state facts, which we will put in proper form. There is no department of a trade journal so interesting to the general reader as well-filled pages of correspondence. This is something that cannot be bought; that is without fixed price, but everyone looks for it and reads it.

Mankato and Kasota Stone.

To the Editor of Stone.

Sir: In response to your invitation for correspondence I will try and describe the stone industry as it exists in this locality. From Mankato to Kasota, extending over a tract some twelve miles long and something over a mile in width, lie vast beds of the lower magnesian limestone, somewhat variable in color and composition in the different strata. In some parts of the district, only two of the principal layers are found, the upper portion having become disintegrated and washed away, or else were never deposited at those points.

The deepest formation is found in the northern portion of this city, where there is a total depth of about 60 feet above the sandstone. The principal ledges worked are commonly designated as the red, grey, soft or cream, bridge and cut stone, stratified respectively, with sometimes lighter ledges of minor importance between. The first is four feet thick; one natural cap is of a hard flinty character, fine texture, and contains a few sand holes, is a bright permanent red in color, and adapted to all classes of work, being frost proof on edge, in any climate.

The grey is 3 feet 2 inches thick, of a similar character, but coarse-grained, and is especially adapted to bridge work. Has one 6 inch and one 8 inch cap.

The soft ledge is 4 feet thick with one cap in the middle. Is firm and even in texture, usually a rich cream color, but sometimes beautifully mottled with brown. Works very easily being much used for capitals and other carved work. Is fire proof and frost proof when seasoned.

The bridge ledge 5 feet thick, has two natural caps; is a rough, coarse-grained, magnesian limestone, somewhat arinaceous. Is guaranteed frost-proof, and is undoubtedly the best bridge stone, except granite, in the Northwest.

The cut stone ledge 4 feet thick, is generally blue in color, sometimes running into buff. This is the same stratum that furnishes the famous pink or fawn colorod stone at Kasota. State Geologist Winchell in his final report says: "That at Kasota is a dolomitic limestone, compact, homogeneous and sub-crystalline, colored probably by some local conformation of the country at the time the Minnesota river constantly flooded the terrace in which it is situated, by which the rock abstracted more of the coloring ingredients (probably iron, and perhaps some manganese), than elsewhere. From the tests made by Gen. Q. A. Gilmore, it is shown to have withstood a pressure test, on edge, of 16,750 pounds, and on bed, of 18,500 pounds per square inch. Its weight was found to be 158.5 pounds per cubic foot.

Both Mankato and Kasota stone have been used so widely throughout the West, that it needs no introduction, on the contrary it needs a defense. With a very few exceptions, the men who have operated quarries here, had no practical knowledge of the business to begin with, and as a consequence they have hurt its reputation by quarrying in the winter, and not confining the different ledges to the purposes to which they are especially adapted. However, the trade is constantly on the increase, the output of both places being about 10,000 car-loads annually. Given a fair chance, and such treatment as any stone of a similar formation should be given, we believe that Mankato and Kasota stand preëminent as a stone producing district in the Northwest. Respectfully, Zip.

Mankato, Minn., March 26.

Serpentine Stone.

To the Editor of Stone.

Sir: I received the two numbers of your paper to-day. Was somewhat interested in an article by Merrill on Serpentines, but differ with him in regard to the Chester county stone. I think he has never seen my quarry, or he would not say that dimension stone are an "Utter Impossibility." There is, to be sure, a limit to sizes obtained, but every season I furnish large quantities of trimmings. I am now furnishing a very fine residence in Minneapolis for J. Frank Collum.

I have sent you by express prepaid a sample, so if any one talks to you about serpentine you can show them the article.

Yours respectfully, Joseph H. Brinton.

Thornbury, Pa., Feb. 28.

The Song We Like, As Sung from Sing Sing.

To the Editor of Stone.

Sir: I am in possession by contract, of marble quarries and lime kilns from the state of New York. Am also sole owner of adjacent marble quarries and lime kilns, out of which I burnt last year nearly 78,000 barrels of lime and ground nearly 5,000 barrels of marble dust. Perhaps you might think I come under the head of Stone, and am morally obliged to support it. Inclosed please find subscription for 1889.

Yours respectfully, W. J. Gilmore.

Sing Sing, N. Y., March 19.

ROCK HISTORY—VII.

THE period following the Jurassic is known as the Cretaceous. It was so named from the most prominent formation of that period—the chalk, Latin, *creta*, hence cretaceous. Throughout England and Europe large areas are formed of chalk. In the American cretaceous the chalk formation or layer is almost entirely wanting. It is only in the last year that any well-defined chalk has been found in America, that having been discovered in Arkansas.

At the close of the Jurassic period the Western ranges of the Atlantic mountains were raised above the water. This left the American continent in two, and perhaps three parts. One was the Northern part of the Eastern section. The Atlantic coast had much its present shape as far south as Georgia. This land extended westward a short distance beyond the Mississippi river, and north to the Arctic ocean. The Western section was comprised by the western part of the Rocky mountains; a long, narrow strip of land. It is probable that this range was divided by a channel which connected the then inland sea with the Gulf of California, a little north of the present limits of the Gulf of Mexico. Thus there was a deep inland sea extending from the Gulf of Mexico probably to the Arctic ocean. It was this section that was raised at the close of the cretaceous period, making for the first time in geological history a united American continent.

With the exception of the chalk, which as said before does not occur on this continent, the rocks of the cretaceous period consist of beds of sand, clay, marl, a loosely aggregated shell limestone and compact limestone. The sandy layers predominate, being of various colors, white, grey, reddish and dark green. They are sometimes solid but are oftener found so loosely aggregated that they may be rubbed to pieces with the hand or worked out with pick and shovel.

The dark green sand of this period is known as green-sand. It is extensively dug for fertilizing, for which purpose it is of considerable value. In New Jersey where it is used in this way it is called marl. This sand is composed of a green silicate of iron and potash, the proportion sometimes running as high as 90 per cent., the rest of the formation is ordinary sand. There is mixed with this a little phosphate of lime, probably the result of animal remains. The agricultural value is probably derived from the potash and phosphates.

In Texas the cretaceous is represented by a compact hard limestone.

The coal beds of the interior, that of Denver being one of the largest, as well as those of the Pacific coast are probably the formation of cretaceous times, although this has not been decided beyond dispute. Dana inclines to the opinion that they are of cretaceous origin. These beds as known cover 20,000 square miles of territory, and contain coal of good quality.

In Europe the chalk beds are the principal and most noticeable formation of this period. These beds extend from the North of Ireland through middle Europe to the Crimea and Caucasas, a distance of 1,140 miles; and in the other direction, from the South of Sweden to the South of Bordeaux, France, a distance of 840 miles. The white chalk of England and France is 1,000 feet thick. When we consider the manner in which it was formed, the length of time necessary for the formation of beds of this thickness is almost inconceivable.

Chalk is a white, pure carbonate of lime. When examined with a microscope it is found to be formed from the remains of extremely small shells known as rhizopod shells. These shells are often found unbroken, while some are partly broken to pieces, and the majority completely disintegrated. The shells are rarely larger than the head of a pin, and the number necessary to make the chalk deposits is beyond realization. Ehrenburg says that a cubic inch of chalk contains more than a million microscopic organisms. It is supposed that chalk-making has gone on without interruption from the time of the cretaceous period to the present time. Deep sea soundings between the depth of 3,000 and 20,000 feet in that part of the continent where extreme cold does not prevail, show that the ocean bottom is covered with a white ooze, or mud, which is composed of the same organisms that form chalk. These shells are found in different conditions, some living, some dead, but still perfect in form, while others are broken or pulverized. It would seem that chalk was formed in the deep sea, and then the part which now appears on the surface was elevated in the cretaceous period.

The animal and vegetable life of the cretaceous period presents interesting features. It was during this period that reptile life culminated. It is in the cretaceous that we find the remains of the largest reptiles yet found—one 70 to 80 feet long. But at the close of the cretaceous these immense reptiles ceased to exist. One of the most interesting features of the animal life of this time is the manner in which reptilian features ran through other animals. We find birds with teeth, after the manner of reptiles, while a reptile without teeth, having the jaws sheathed with horn, has been found. One of the turtles of this period found in the Rocky mountains, had a length of nearly thirty feet and a breadth across the flippers of fifteen feet.

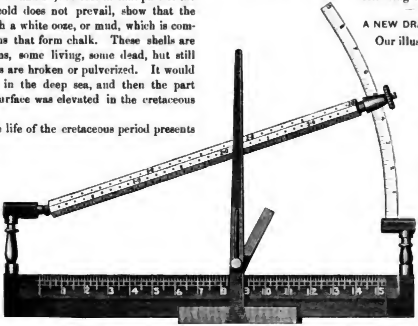
Up to 1858 there had never been any undoubted tracks of birds found belonging to an earlier period than the one following the cretaceous. In that year the remains of a bird resembling a gull were found in the green-sand of England. In 1882 the remains of a bird allied most wonderfully to reptiles were found in Germany in the Jurrassic rocks. In 1870–1, Marsh found in the cretaceous of New Jersey and Kansas twenty species of birds, five of which are allied to the rail and snipe, being known as waders, five allied to the cormorants, divers, etc., known as natores or swimmers, and ten entirely different from any birds existing now. They were the most extraordinary birds known, all having teeth. Some of them were without the horny beak of all birds known to-day, but had instead, long, thin slender jaws, furnished with sharp, conical teeth, set in sockets. They had the ordinary keel of modern birds, to which the powerful muscles used in flying are fastened. These birds were about the size of our snipe. The remaining birds also had teeth, but they were set in grooves instead of sockets. They were without the keel attached to the breast-bone, and were not calculated for flying. These latter birds were of extraordinary size, being five to six feet from snout to toe.

It is in the cretaceous that we find the first of modern fishes, known as teleosts. These fishes were related to our salmon, perch, pike, etc.

As in fishes, so in vegetable life. It is in the cretaceous that we first see modern life. The first trees resembling those of to-day appear here and are related to our maples, oaks, willows, etc.

At the close of the cretaceous the entire western part of the continent was upheaved. The great inland sea was abolished, and the eastern part of the Rocky mountains was raised. We find cretaceous beds many thousand feet above the sea at the top of the Rockies. It is supposed the entire northern part of the continent was higher at the end of the cretaceous, and consequently cooler than in latter geological times; that there was a subsidence, or sinking, of this northern section in the period following the cretaceous.

A NEW DRAUGHTING INSTRUMENT.



Our illustration shows a new scale for use of draughtsmen and carvers for which a patent has been applied for. By use of this scale any desired number of spaces may be at once obtained between any two given points. In spacing for letters or ornaments on stonework the utility of the scale will be at once recognized.

The octagon bar has on each of its sides a scale varying in number of degrees. There are two movements, one revolving on axis and one swinging on the curved arm, the former to give any space desired and the other shortening the space to the distance required. The attachment of the ordinary T square will give the desired angles.

The instrument is the invention of Silvester Hoadley, of the firm of Hoadley Bros., marble and granite dealers of Gosport, Ind., to whom inquiries should be addressed.

Wm. Wallace, secretary of the Soldiers' Monument Committee, will receive designs and sealed proposals for a soldiers' monument to be erected in Monument Park, in the city of Warren, Ohio. Monument to be granite, with granite color bearer statue on top, and two seven-foot standard bronze statues at base. Bids to be opened at 1 o'clock p. m., April 10, 1889. Monument to be erected at as a early a day as possible and to cost about $9,000. Committee to build foundation. Terms, spot cash on acceptance of monument by the committee. Right to accept or reject any or all bids. The secretary will be glad to confer with a representative of any person wishing to offer designs and proposals for said monument as to height, etc. Address Wm. Wallace, Secretary, Warren Monument Committee, Warren, Ohio.

THE RELATIONS OF ECONOMIC GEOLOGY TO CIVIL ENGINEERING IN BUILDING CONSTRUCTION.

[Thesis by Chas. H. Ross, Post Graduate in C. E., Alabama State Agricultural and Mechanical College.]

Civil Engineering is defined by Wheeler to be "that branch of engineering which comprises the designing and building of all works intended for the comfort of man, or to improve the country either by beautifying it or increasing its prosperity."

Economic Geology is defined by Williams to be "that department of science which treats of the earth's structure and mineral products as they are related to the supply of the human wants."

Their relation is this: What one supplies, the other erects

In this discussion, however, I will treat only of the following important features of building construction:

I. Various kinds of building and ornamental stones.

II. Their occurrence—geographically and geologically.

III. Their necessary qualities—strength, durability and hardness.

IV. Their desirable qualities—beauty and ease of working.

V. Their selection.

I. Various Kinds of Building and Ornamental Stones.

When used in building construction stone may be divided into two classes, viz.: natural and artificial. Natural stones are those which are found already formed in nature. Artificial stones are, as the name suggests, merely imitations of the natural, and are formed by the intimate mixture of different substances. The natural stones may be divided into three classes, silicious, argillaceous and calcareous.

1. Silicious stones are those in which silica is the principal constituent. Their structure is crystalline granular, and the grains are hard and durable. The principal varieties are granite, syenite, gneiss, mica slate, hornblende slate, steatite and the sandstones.

Granite, which comprises syenite and gneiss, and is composed of quartz, feldspar and mica, is one of the best of building stones, being equally noted for its strength, hardness, durability and resistance to the chisel. It is used in the largest works, such as light-houses, revetment walls, fortifications, etc.

Mica slate is composed of the same materials as gneiss, and when broken, presents a glistening surface. The best kinds are used for flagging, for door and hearth stones, and for lining furnaces.

Hornblende slate is a black or greenish-black schistose rock, tougher than mica slate. It is used in flagging.

Steatite, or soapstone, is a massive granular talc of whitish, grayish, or greenish color. It is soft, easily worked, and refractory in its nature; hence it is used for lining furnaces and fire-places.

Sandstone consists essentially of quartz, the grains of which are cemented together by some compound of silica, alumina and lime. It is of every shade of color, has a harsh feel, and yields readily under the chisel. It is used for building purposes, for flagging, and for road material.

The other varieties of silicious stones—porphyry, trap or grindstones, basalt, quartz-rock (cobble-stone,) buhrstones—are also used for engineering purposes, and are all noted for their strength and durability.

2. Argillaceous stones are those which contain clay as their principal consituent. All, except roofing slate, are unfit for engineering purposes, as they lack both strength and durability.

Roofing slate is a stratified rock of compact texture, great hardness, and dark, dull blue or purplish color. On account of its imperviousness to water, it is used for roofing and for lining water tanks.

3. Calcareous stones are those in which lime is the principal constituent.

Calcium sulphate, known as gypsum, is too soft for building purposes; but, when burnt and reduced to a powder, it is called plaster-of-Paris, which is used to give a hard finish to walls.

Calcium carbonate, or limestone, is generally distinguished by being easily scratched by a knife, and by effervescing with an acid. The limestones are divided into two classes: common limestones and marble; the former being used for all ordinary building purposes requiring strength and durability, and the later ornamental purposes on account of its susceptibility to a high polish. Under the first class are grouped a large number of important building stones, some of which are as strong and as hard as the silicious stones, others decompose when exposed to the atmosphere, while others have the peculiar property of hardening after exposure to the air, although they are very soft when quarried.

Under the second class are inclosed the statuary conglomerate, bird's-eye, lumachella and verd-antique marbles, all of which are distinguished by their beauty and by the peculiar forms and colors distributed throughout them.

II. The Occurrence of Building and Ornamental Stones—Geologically and Geographically.

In the United States, by the census of 1880, there were 1,525 workable quarries, which produced in one year 115,380,133 cubic feet of stone, valued at $18,355,055. As regards the total product of the states, Ohio led, followed by Pennsylvania, Vermont, Massachusetts, Illinois, New York, Maine and Connecticut, each of these states producing about $1,000,000 worth of stone. As regards limestone and marble, 65,523,965 cubic feet were produced, Vermont leading in value $1,192,100 of marble, and Illinois in amount, 13,013,139 cubic feet of limestone. As regards sandstone, Ohio led with a product of 8,574,726 cubic feet. As regards granite and other silicious stones, Massachusetts led with a product of 4,623,125 cubic feet, followed by Pennsylvania and several other states, making in all 24,506,568 cubic feet. As regards slate, Pennsylvania led with a product of 2,713,130 cubic feet, followed by Vermont and seven other states, making in all 4,572,670 cubic feet. Granite, slate and marble are found, it will be seen, mostly in the Appalachian range, from Maine to Georgia, limestone, in the north central states, and sandstone in the areas between these regions.

When we examine the geological periods for the building stones of this country, we find the oldest lying in the Archaean epoch—granites, syenites, schists, etc. Besides these varieties, there are found trachyte and porphyry, both of which are used where they are quarried as ornamental building stones. Among the Silurian rocks are chiefly found the marbles and slates, though many workable stones are derived from the Archaean. That large area, now occupied by the central western group of states from Ohio to Kansas, seems in former geological periods to have been a great inland sea, in which were built up by coral animalculæ a vast amount of limestone, from which are derived most of the common limestones of today. Sandstones come after these and are found distributed throughout the lower silurian and subcarboniferous periods.

In the Rocky mountains are found all varieties of good building stones—granites, sandstones, marbles and volcanic rocks. On the Pacific coast, there are found "mountains of granite, immense beds of sandstone," and some steatite, the latter well adapted for building purposes, being light, fire-proof, very durable, and easily quarried and dressed.

In Alabama, magnesian limestone, or dolomite, is found more abundantly than any other calcareous formation. In Talladega county some marble is quarried, but the product is less than 20,000 cubic feet.

III. The Necessary Qualities of Building and Ornamental Stone—Strength, Durability and Hardness.

1. Strength. The heaviest stones are generally the strongest. The stones (a) which have the closest texture and the finest grains are the strongest; for, if the grains are large and loosely put together, the result is, if any pressure be exerted, that they will be torn apart. The more (b) cementing material the stone contains, the stronger is it. In this condition, the cohesion of the grains is greater. (c) The harder and more cleavable the grains, the stronger the mass; for, whatever force is exerted on the entire surface is exerted on each grain separately. (d) The direction of the strain is of great importance; for experience proves that the stone which is acted on by a force perpendicular to the plane of bedding is the strongest. All stones, hence, "should be laid on their natural bed." (e) Elasticity is an important quality to consider with regard to a stone, especially when it is to be used as a lintel for doors and windows. It is found by experiment that the elasticity of limestone is greater than that of sandstone and granite. (f) The porosity of a stone detracts materially from its strength.

In the test of a number of Haverstraw freestones, a stone of mean size, which had a length of 10.92 inches, a compressed surface of 121.55 square inches, and a weight of 105 pounds, sustained, as its ultimate strength, an applied load, 791,000 pounds, or 6,508 pounds to the square inch. The compression at a load of 600,000 pounds was .0575 of an inch.

General Gilmore gives the following as the extremes of strength in the most important stones:

Granite—	From	9,500	pounds	to	24,040	pounds.
Marbles—	"	7,612	"	"	20,025	"
Limestones—	"	3,450	"	"	25,000	"
Sandstones—	"	4,200	"	"	17,250	"

2. Durability. This most essential property of a building stone depends (a) upon the material of which the stone is composed; and (b) the position in which it is placed. By durability is meant "the power to resist the wear and tear of atmospheric and aqueous agencies, and the capacity of sustaining a high temperature. A stone is most durable when (a) the materials which compose it are strongly consolidated, so that attrition, blows, rubbing, the force of wind, blown sand and dust affect it but little. (b). When its texture is compact, and when the cementing material is profusely distributed, or when the crystals interlock each other, then is the stone dura-

ble. The denser a rock the less liable the introduction of water into it, and, hence, the less likelihood of immediate decay. The action of frost on stones is the most destructive of that of all the forces of nature. The effect of frost varies with the texture of the stone, those of a fissile character splitting, those of a porous kind disintegrating or exfoliating at the surface. Water, in freezing, expands about 9 per cent., with a force sufficient to tear open a porous stone, besides causing its edges to crumble and its laminæ to separate. (c). The fineness and uniformity of the size of the grains in a stone determine in some measure its durability. The quality must always be considered, for, it is clear that the large irregular grains present an uneven surface to a force pressing upon them, and the larger grains necessarily crush the smaller. (d). A stone is injured very materially by the presence of foreign materials, which are disseminated throughout the rock, either as cementing matter or as a coloring substance. Of these materials, pyrites is the most injurious and widely diffused. Either when it occurs in large nodules, or in the most imperceptible grains its presence is deleterious for it tends both to weaken and to disintegrate the mass. Also, iron carbonates and several iron oxides are injurious, particularly in red or brown sandstones, where the oxides act both as a cement and as a coloring matter. Clay, when present in small quantities, disseminated throughout a mass, is beneficial; but if it is found forming seams and knots of appreciable size in sandstones and limestones, it is very injurious. (e). The locality in which a stone is placed affects its durability. Stone is observed to wear more in cities than in the country, and more in positions exposed to the prevailing winds and rains than in sheltered places and in the interior of structures. When the faces of a strata are exposed, the wear is greater than if the edges were exposed; for, in the former case, the water soaks in freely, and the exposed surface crumbles, peels off, and the rock slowly disintegrates; while, in the latter, though the water soaks in and percolates more freely, yet the weight and pressure of the superincumbent mass tends to keep the strata more firmly in place. (f.) Water acts more readily on a rock when it is in its natural bed than when it is in a structure, but, in large cities where the rains and fogs are frequently accompanied by the sulphurous gases, which the consumption of coal furnishes to the atmosphere, some stones, particularly magnesian limestone (as in the new Parliament house at London), are ruined, though they had remained intact in their beds for centuries. (g). Stones convey heat very slowly, but are yet subjected to expansion and contraction according to variations of temperature. Experiments on the linear expansion of granite, limestone and sandstone show that fine-grained granite varied 000004825 of its length for a change of 1° F.; that white, fine grained crystalline limestone from New York varied 000005668, and that a somewhat coarse-grained red sandstone varied 00000941. Hence, in climates where there are sudden and great changes of temperature, it is important to take into consideration the expansion and contraction of all stones. As limestone is the most elastic of the three above mentioned rocks, probably it can be used to better advantage in such climates; also, in great fires, stone in structures adjacient to those burnt are no doubt materially injured by expansion, experiment having shown that in a long line of coping, the expansive force was sufficient to squeeze out the mortar in the seams.

3. Hardness. This is a necessary quality of a stone, especially when that stone is subjected to wear from attrition, as in pavements, flagging, and for the steps of stairs. Hardness is generally found in coarse-grained rocks, as the fine-grained are much more easily worn.

IV. Desirable Qualities of Building and Ornamental Stones—Beauty and Ease of Working.

1. Beauty. It is obvious that the importance of the desirable qualities is much less than that of the first-class. But they must not be totally neglected in the selection of a good stone. For a desirable requisite in architecture is that a structure should possess at least some beauty. The ancients, no doubt, in building, thought as much upon the beauty, as upon the utility of an edifice. Their beautiful and graceful inventions—the Corinthian, Doric and Ionic styles—have remained to this day as imperishable evidences of this fact. As regards the beauty of building stones, much depends upon individual taste and current fashion. The neutral tints, the grays, the buffs and drabs, afford the most pleasing colors; the reddish-browns are also pleasing to the eye, but, in selecting a stone thus colored, much discretion must be used, as the cementing material, which also gives the color (generally an iron oxide), causes decomposition and disintegration. When a dark stone is used, it lends a sombre aspect to a structure, but the effect produced is relieved by the use of light trimmings. White, in the bright sunshine, and on account of its liability to become soiled and dingy, is objectionable as a color, though, possibly, stones of this color are freer from impurities, than others. It is necessary, also, to notice the effect of the weather on a stone's color, for some that are pleasing when quarried, in process of time assume a dirty and disagreeable hue. On the other hand, some stones, as sandstones and earthy limestones, though dull and almost ugly in color when in their natural state, assume a beautiful and often variegated aspect when dressed or polished.

2. Ease of Working. The qualities that fit a stone for strength and durability are the opposite of those for ease of working. Generally, a hard, tough, heavy stone is the strongest and most durable, while a light, soft, porous rock is worked and polished very easily. But facility of working should always be subordinate to strength and durability. The ease with which a stone may be dressed depends: (a). On the hardness of the minerals which compose it, and on the cementing material. Granite, silicious sandstone and limestone are worked with more difficulty than granular limestone of open texture. Also, when the cement consists of finely disseminated clay, the rock is much more easily dressed than when the cement is a metallic oxide. (b). The structure and mode of fracture of the rock determines largely the ease of dressing; a laminated or foliated structure gives much facility, and if there be a cross fracture, a hard stone can be worked with comparative ease. A conchoidal fracture gives ease in dressing stone for a rubble-faced wall, and, if delicate figures are to be cut, there should be no brittleness, and a complete homogenity of both structure and texture, thus enabling the stone to be worked in any direction without fracture; both silicious and calcareous freestones possess this valuable property. It is best to dress stones immediately after being quarried, as the surface, particularly in some limestones, often hardens on exposure to the air.

It is important to notice the manner of dressing a building stone. When it is dressed by means of blows directed by mallet and chisel against the surface there is a tendency to crush and to dislocate the grains, and thus ultimately to cause disintegration. General Gilmore has shown that sawn cubes were 25 per cent. stronger than tool dressed cubes of the same stone. Experiments on Indiana oolitic limestone have proved that the difference between the two methods was a change of one-third in strength, and nearly one-half in elasticity. This does not seem so strange when we remember the well known mechanical principle that any stone (or any body for that matter) may be broken or fractured by the repeated blows at the same place and in the same direct line.

V. Selection of Building and Ornamental Stones.

There are several physical qualities that should be remembered in selecting a building stone. Those rocks, formed by the union of quartz, feldspar, hornblende and mica, are generally very durable, though when feldspar is present and has microscopic pores, water gets in and the rock weathers rapidly. Pyrites, also, very seriously impair the durability of rocks in which it occurs. Where the minerals, again, are coarsely crystalline, it is not a good stone. Those granitic rocks, formed of quartz, feldspar, with a little mica, and that have small and well-formed grains, make the best building material.

A granite should have a fine grain, even texture and its constituents evenly distributed throughout the mass. The presence of any foreign material, as iron pyrites, causes the stone to rust and to be defaced.

The best sandstone is found in thick strata, where it shows faint signs of stratification. It should be firm in texture, not liable to peel off when exposed, and, like granite, should be free from iron oxide or pyrites.

A good roofing slate should split easily into even slates, should admit of being pierced for nails without fracture, should be compact, smooth, uniform in texture, of a clear dark color, should give a ringing sound when struck, and should absorb little water.

Limestones, for building purposes, should be as free as possible from foreign materials. The presence of clay, ferrous oxide, and iron sulphate and carbonate, is very injurious, and in some cases where they are present, rapid disintegration is the result.

In selecting a building stone, the first and by far the most important consideration is its durability. The examination of a stone in its natural bed, particularly the outcrop, will, in a large measure, indicate its durability. If there are no signs of crumbling, no debris scattered around the outcrop, and no indications of a tendency to split, it is a good rock.

As regards strength, it is safe to make a large allowance for a stone. Generally the blocks in a structure have to sustain only about one-twentieth of the load that, in a test, is used to find their ultimate strength. The extreme pressure in a wall fifty feet high is from fifty to sixty pounds to the square inch, or only about one one-hundred and twelfth of the pressure on the Haverstraw freestone cube one of the weakest stones. In a tower of stone two hundred feet high, the pressure at the base would be from two hundred to two hundred and fifty pounds to a square inch, or only about one twenty-eighth on the same freestone cube.

A very serious error is sometimes made in selecting a stone for its beauty before testing its durability. The only thing saved is a little extra expense, but in the long run, the rapid disintegration of a beautiful but soft and porous stone will cause more expense in its replacement than was saved in the first instance.

The last, and possibly the least, qualification in selection is facility of dressing, which can be secured by repeated observations of the various qualities that strength, durability and beauty call for.

In conclusion, it must be borne in mind that selection depends, in a large variety of cases, upon local supplies. Also, a stone that would be unfit for one position would suit exactly for another. Good common sense can always supply the minor details, but nothing is more important than a thorough knowledge of economic geology, in the selection of materials for the structures which civil engineering erects.

CONTRACT NEWS.

New York.—

Thayer & Robinson, New York City have prepared plans for the erection of five residences for H. M. Reynolds. Total cost $115,000, and none of the contracts are let.

J. Simeon will build a flat building on Madison street, New York City. Wm. Granl, architect. Cost $21,000.

Chas. W. Clinton, New York City, has prepared plans for an office building to be built for M. Wilkinson, same place. To be 84.9x76 feet and 10 stories high. Cost $400,000 and none of the contracts have been let.

A $50,000 depot will be erected at White Plains by the Harlem Railroad Co.

The United Presbyterians, Buffalo will have built a $30,000 edifice.

Plans have been prepared by W. A. Potter for the erection of a parish house and Sunday-school in Pongbkeepsie. To be built of sandstone, and cost $15,000. Rev. H. L. Siegenfuss, the pastor can give details.

Thom & Wilson, New York City have prepared plans for two handsome flat buildings to be erected for T. A. & W. H Hall. Each to be 41.7 x 90 feet, built of brick with stone fronts. Estimated cost $100,000.

Thom & Wilson, 1267 Broadway, New York have prepared plans for two flat buildings to be erected for Geo. J. Hamilton. Cost $95,000. No contracts as yet awarded.

James McNiece, New York City, will have erected on Ninth-street two store and flat buildings. J. H. Valentine is the architect. Cost $45,000, no contracts are let.

Joseph Wandewater, New York City, has had plans prepared by architects Rose & Stone for three flat buildings. Cost $175,000; no contracts let.

Messrs. VanRessnellers of Albany have had plans prepared for a double residence. Longfellow & Harlow of Boston are the architects. Estimated cost $25,000.

Missouri.—

J. H. Cheek of Kansas City has had plans prepared for the erection of a fine residence. A. B. Cross is the architect. Cost $25,000.

W. F. Hackney of Kansas City has plans for the erection of a business block for W. Long at that place. It will cost $75,000, and contracts have not been awarded.

W. F. Hackney, Kansas City has prepared plans for a residence to be built for Thos. Corrigan same place. To be 56x84 feet, built of stone, marble, and red and white granite. It will cost $100,000 and contracts are not yet let.

Thomas Corrigan, of Kansas City will erect a business and office block on 11th and Walnut streets. Cost $100,000. Contracts are not let.

John Doggett of Kansas City has had plans prepared by Architect Marcotte for the erection of a business block. It will cost $300,000 and no contracts are let.

G. C. Smith of St. Louis will have erected on Lindell boulevard, a fine residence. The J. B. Legg Architectural Co. have prepared plans for same. To be 28x72 feet in size and two stories high. Cost $15,000.

District of Columbia.

Wm. B. Gray has prepared plans for Col. Henry Strong, who will erect a fine building on F street, Washington, $50,000 cost. Contracts not let.

Plans have been prepared by Wm. Bruce Gray of Washington for the erection of a church at that place. Estimated cost $65,000, and no contracts are let.

The district commissioners of Washington will erect five new school buildings, and make improvements on other buildings. $290,000 will be expended for this purpose.

The Second Baptist church congregation, Washington, contemplate erecting a new church building. Cost $20,000.

W. Nordlinger of Washington will erect a store building. Size 24x102 feet. Cost $25,000.

Illinois.—

The Mayor of Waukegan will give further details of a fine high school building to be erected there soon. Size 80x120 feet, and two stories high. Cost $30,000.

C. Brenker of Chicago will build two semi-detached rockface stone front residences. L. G. Hallberg is the architect. Cost $12,000.

I. K. and A. B. Pond have prepared plans for a handsome residence to be erected for Mrs. John C. Cooley, of Chicago. Estimated cost $50,000.

M. L. Beers of Chicago is preparing plans for a school house to be erected on Duncan-ave. Size 85x87 feet. Cost $25,000.

Canada—

Plans are wanted until May 1, for a $75,000 court-house, to be erected at Woodstock. Address James White, county clerk.

Maine.—

The National Soldiers' Home of Augusta will have two new buildings, Cost $75,000

Pennsylvania.—

Alston & Heckert of Allegheny City have prepared plans for a block to be erected by J. L. Forsa'th in Sharpsburgh. It will cost $20,000.

M. E. Beebe & Son of Buffalo, N. Y. have prepared plans for a court-house to be erected at Pottsville. It will cost $200,000, and none of the contracts are let.

The Athletic club of the Schuylkill navy has had plans prepared by W. G. Hale, 1328 Chestnut street, Philadelphia, for a club-house. It will be 44x150 feet in size and five stories high. It will cost $40,000, and contracts have not been let.

Michigan.—

The Congregationalists of Kalamazoo have had plans prepared by S. J. Osgood of Grand Rapids, for a church. To be 80x120 feet; cost $50,000. No contracts let.

Sam'l E. Waters will have plans prepared for the erection of a large business block, on Ottawa and Lyon streets, Detroit. Cost $250,000 and the contracts have not been awarded.

Mrs. Ellen Hammond of Detroit will have erected a fine business and office block. Plans were prepared by Mason & Rice. It will cost $40,000.

Massachusetts.—

A new building will be erected at Southboro for St. Mark's Episcopal school, at a cost of $150,000.

James Fagan of Boston is having plans prepared for the erection of a flat building on Dale street. Cost $18,000. The contracts have not been awarded.

Indiana.—

Several new buildings will be erected for Purdue University at Lalayatte. $45,000 will be expended.

Brackett & Barrett, of Rochester, are having plans prepared by T. Long of Chicago, for a fine hotel. It will cost $40,000, and contracts have not been let.

Kansas.—

E. T. McFarland & Co., Hutchinson will have erected a store and office building. To be 150x80 and the cost will be $32,000.

DePry & Thompson, Hutchinson, are preparing plans for flat to be erected in same place for Z. Coal. Cost $42,000. No contracts are awarded.

Georgia.—

Athens will have a new Y. M. C. A. hall.

A large hotel will be built at Americus. Estimated cost $25,000. Moses Speer may be addressed for particulars.

California.—

The Academy of Science, of San Francisco will have erected a handsome building on Market-st., to be 80x200 feet and cost $270,000. Contracts not yet let.

Ohio.—

An edifice will be erected on Mt. Auburn, Cincinnati, for the Presbyterians. H. E. Siter, the architect will superintend the work, and communications may be addressed to him. Probable cost $50,000.

Nebraska.—

Schwesser, Perkins & Gates, of David City, have had plans prepared by J. G. Burgraff & Son, for a business block. Estimated cost $20,000. No contracts have been let.

Iowa.—

E. W. Loft has prepared plans for the erection of a fine residence for T. R. Galbraith of Sioux City. It will cost $15,000. Contracts have not been awarded.

Dakota.—

A. Burnham has plans prepared for a city hall to be erected at Deadwood. It will cost about $20,000 and the architect can give details.

Rhode Island.—

A parochial school will be erected for St. Mary's church at Pawtucket. It will cost $30,000 and no contracts have been let.

Tennessee.—

Jno. P. Richardson will erect a handsome residence at Chattanooga. Cost $5,000.

Kentucky.—

A new building will be erected for the Pleasant J. Potter Female College at Bowling Green. Estimated cost $25,000.

Texas.—

Plans are being prepared for a hotel to be built at Oak Cliff. Cost $50,000.

Alabama.—

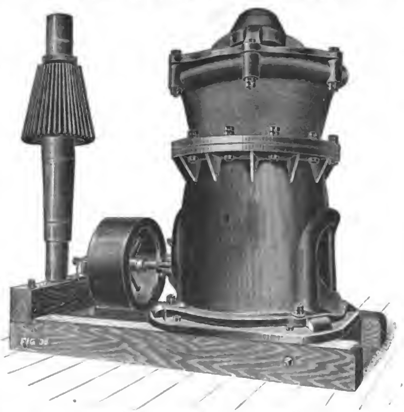
The Catholics will build a church at Birmingham. Cost $50,000.

ADVERTISERS' DEPARTMENT.

MATTER APPEARING UNDER THIS HEAD IS NOT THE OPINION OF THE PAPER.

THE GATES ROCK AND ORE BREAKER.

A FEW years ago the only machine for breaking stone was the "jaw breaker," a machine still in use and but little improved upon. Up to that time road metal was in a great measure made by hand—largely by convict labor. Railroads had scarcely begun rock ballasting. The introduction of the Gates Rock and Ore Breaker, involving an entirely new principle, has worked a revolution in the United States. As a result, many of the roads of this country, especially in the cities and their suburbs, are not excelled by any in the world. Railroad companies, wherever possible, adopted stone ballast. More road metal has been used in the last few years in the United States than had been used for a century before. The increase in value of public highways can hardly be estimated. The cost of broken stone has been reduced until it is literally cheaper than dirt. The Gates Rock and Ore Breaker has increased the capacity for turning out broken stone many fold over any other machine. It has, by its construction and adaptability for the purpose, produced the most perfect cubical stone—the desired shape required for road metal. It has done all this at a saving of power and labor that has reduced the cost of broken stone to a minimum. All these claims are amply sustained by hundreds of testimonials and many competitive tests. As the diameter of the breaking head in the Gates Rock and Ore Breaker corresponds very nearly with the width of the jaw in the old-style (Blake) jaw breakers, receiving the same size stone, it follows that the circumference of the head in the Gates machine is three times as great as the width of the jaw breaker, and that, therefore, it has three times as much breaking surface; and as the head in this breaker makes a complete gyration in the same time required by the old-style jaw to approach and recede, it is apparent that in a given time this machine has operated upon three times as much material as the jaw machine. The head in the Gates breaker enlarges toward the bottom, or discharge point, consequently the breaking surface increases very rapidly; and the material being broken into more and more pieces on its way to the discharge point, has surface to spread out, and thus to be reduced much smaller than in the jaw machine, which has the same width of breaking surface top and bottom, and consequently no opportunity for spreading out. For this reason the breaker can be set up much closer than the jaw breaker without danger of packing, and without cutting off the capacity to discharge. The head and concaves, or liners, both being cylindrical in form, the pieces of rock or ore, in touching the concaves, leave behind them a space as though the pieces were supported at their ends, thus facilitating a clean break when the head strikes them in the middle. This advantage must be strikingly apparent to every one. In breaking a stick of wood by a blow, no one would undertake to lay the piece upon a flat surface, but would support it at its ends. This form of breaking surface also prevents flat pieces from falling through, and thus does away with objectionable spalls. Being circular in form, and having a gyrating motion, there is no shaking when the breaker is in operation. For this reason, also, it requires no ponderous foundations, and may be set up in rock houses, etc., without danger of shaking a building to pieces. The main shaft being loose, will turn backward or forward until it has adjusted itself fairly to the material before breaking it, and as it is changing its position constantly, the wear on the head or cone is evenly distributed, as also upon the concaves, or liners. The shaft being supported at the bottom, and being loose, moves in a straight line to its work, and thus there is absolutely no rubbing or grinding motion as in the jaw machine, the jaw of which moves in a small arc, and being rigidly connected at top has no liberty to adjust itself to its work. This breaker having a cylindrical head, or breaking cone, only a small line from top to bottom comes in contact with the material at one instant, but having a continuous motion, the same power is exerted constantly. This is why heavy fly-wheels are not required to store up power, and why there is no waste. In the jaw type of breaker there is ten times as much surface in contact with the material at the instant the jaw advances as there is in this machine, and power enough must be exerted to overcome this great strain. For this reason the heavy fly-wheel is a necessary part of the jaw breaker to store up power while the jaw is receding and no work being done; nevertheless, a large part of the power is lost, since the engine cannot recover.



To sum up, the advantages claimed for the Gates Rock and Ore reaker are B: It will do double the work of and jaw breaker; it takes nearly one-third less power to do the same work; it does not require heavy foundations; it can be made to break smaller; it does not shake or jar, but runs perfectly smooth; the breaking faces will wear from two to three times as long; there is no grinding or rubbing motion, since the breaking head does not revolve; it requires much less repairs; it has three openings, which admits of a cart load or dump car load of material being thrown into the hopper at one time; being circular in form, it will not let flat pieces pass through like a jaw breaker; it has the same advantage that a circular saw has over an up and down saw, since it has a continuous breaking motion, while a jaw breaker does no work during the backward movement of the jaw; it has a safety device intended to prevent any breakage of the machine in case a sledge or crowbar should get into it; by the use of this machine work can be done at much less cost; owing to the above advantages the cost of this machine is much less than any other in the market. These breakers are built up to 45 tons weight, capable of producing from 150 to 200 tons of broken stone per hour. The large mining and railroad companies are taking the larger sizes, while the small ones go to all parts of the world.

Further particulars regarding this machine may be had by correspondence with the manufacturers, Gates Iron Works, No. 50 South Clinton street, Chicago, Ill.

THE WARDWELL CHANNELING MACHINE.

From the new circular issued by the Steam Stone Cutter Co., of Rutland, Vt., we glean the following recent testimonials of the celebrated Wardwell Channeling and Quarrying Machines:

The Steam Stone Cutter Co., Rutland, Vt.

Gentlemen: We are now working thirty-four of your Channeling Machines in our various quarries, and consider them the superior of anything in that line. They are durable and well made, and the machine that every quarry owner ought to have. You may refer to us. Yours truly, THE CLEVELAND STONE CO., J. W. Worthington, Pres't.

Cleveland, O., Dec 4, 1888.

The Steam Stone Cutter Co., Geo. E Royce, Treas, Rutland, Vt.

Dear Sir: Replying to your favor of Dec. 1st, 1888, we have to say of the four machines that we purchased of you during the past year, that we have had them constantly at work since their arrival, and we find them satisfactory in every respect, and we have now just ordered three more, making seven machines purchased of you this year; all of them the Narrow Width, 4' 1" Double Gage Machines Our rock is particularly trying to Channel Machinery, but we have found in the Wardwell a machine which is able to accomplish the work which we have to do. We unhesitatingly recommend it to all free-stone quarrymen, as one of the most useful machines to the modern quarry. Yours respectfully,

THE NEW ENGLAND BROWNSTONE CO., Fred DePeyster, Supt.

Cromwell, Middlesex Co. Conn., Dec. 4, 1888.

Geo. E. Royce, Esq. Rutland, Vt.

Dear Sir: We take pleasure in reporting to you the record of the Machine we purchased from you, made last summer. On one day, having run 13 hours, we measured the work done, and found it to have cut 700 feet, being 538 feet for a working day of 10 hours. For one month we have averaged 400 feet for each working day of 10 hours The above record was made when working both sides of Channeler all the time. We did not keep track of its record when only working one side, as we very seldom made single cuts. When we purchased your Channeler we expected good results, as we had observed its working in other quarries, but it has far surpassed our expectation, and, consequently, our pleasure in giving you this testimonial of its efficiency, is greater.

Respectfully yours, HARTLEY BROS.

Houghton, Bayfield Co., Wis., Dec. 20, 1888.

Messrs. Steam Stone Cutter Co., Rutland, Vt.

Gentlemen. Your favor of the 6th inst., at hand, and I note what you say. I take great pleasure in stating that on April 18th, 1885, I ordered one of your Steam Stone Channeling Machines, Wardwell Patent, which was the pioneer machine in the brownstone quarries on Chequamegon Bay, now Lake Superior's noted brownstone quarries; and its true merit has put your machine into every quarry that has been opened on the Bay since. Other machines were tried on the opening of some of the quarries, but as time went on all had to fall back on the Old Reliable Wardwell Patent

There is not a quarry in the vicinity in operation but has from one to four of your machines in use, and few if any of the various other patents are now in use.

I have two of your machines in operation, and am in hopes that the future demand for stone will warrant the ordering of more machines in the near future. Yours truly,

BAYFIELD BROWNSTONE CO., R. D. Pike, Manager.

Bayfield, Wis., Dec. 13, 1888.

Steam Stone Cutter Co., Rutland, Vt.

Dear Sir: We have three of your Wardwell Machines now in use in our sandstone quarry, and we find them a good machine They are easy to keep in repair, and seldom break down, which is quite an item, especially when quarries are far removed from the vicinity of machine shops They are a machine that does good work, and will do a large amount of it if properly attended. Yours truly, ASHLAND BROWNSTONE CO.

Ashland, Wis., Dec. 17, 1888.

Steam Stone Cutter Co., Rutland. Vt.

Gentlemen: This certifies that the Limestone Machine purchased for my quarry here, and the Sandstone Machine purchased for the quarry of Babcock & Smith at Houghton, Bayfield Co., Wis., (on Lake Superior,) have been operated during the entire stone season of 1888, to our entire satisfaction. Further, we can say, that while we had no doubts as to getting good results from the Machine, we were surprised to get through the season with so small an expense for repairs and extras, and we also fail to see wherein our Machines are not, at present, good as new. C. W. BABCOCK, Kasota Minn.

BABCOCK & SMITH, Houghton, Bayfield Co., Wis.

Kasota, Minn., Dec. 24, 1888.

Steam Stone Cutter Co.

Gents: Having a very large brownstone property and intending to develop and work it extensively, I made a thorough investigation in regard to the best improved machinery for quarrying, and decided to use the Wardwell Channeling Machinery, and last spring and summer purchased 5 of your Double Gang Sandstone Machines, and as they have fully met our expectation in use, we now give you an order for 5 more, making 10 purchased inside of a year, 7 of them Narrow and 3 of them Wide Gauge Machines. The above indicates what we think of your machines. Yours respectfully,

F. PRENTICE, Pres't. Prentice Brownstone Co.

Ashland, Wis., Feb. 28, 1889.

PATENT CHILLED IRON GLOBULES.

Messrs. B. C. & R. A. Tilghman, Philadelphia, Pa., present something of importance to stone-workers in a new, large advertisement on page 3 of this issue. There is nothing superior for fast sawing and rubbing of stone than chilled iron globules. The firm named is sole patentees and manufacturers of these useful articles. We invite the attention of our readers to the important notice in regard to a reduction in former prices and the advantageous terms on which they are sold.

MEXICAN RUINS.

An interesting antiquity has recently been discovered at Palenque in the Chiapas district of Mexico. The monument is situated upon the river Xhupa. Although it is now a complete ruin, it was originally a structure of considerable height; as three distinct stories are still distinguishable. The ground floor is very large, measuring some 120 feet by 75 feet. The floor above is attained through holes in the ceiling or vault, and here a room is found measuring some 27 feet by 9 feet. The openings referred to are natural, and have been formed by the disintegration of the stone and the sinking in of the roof. On stone slabs set into the wall are bas-reliefs of human figures, warriors, etc. Although these stones are in a very bad state of preservation they are to be sent to the capital of Chiapas. Near this ruin are a row of houses forming a street, and not far from these the vestiges of quite a large town, all of course in a state of complete ruin.

SPECIAL NOTICES.

"For Sale" ads. will be inserted at the low rate of one cent a word, each time. Terms, cash with order.

Workmen wanting situations, are requested to avail themselves of our columns to make their wants known. There will be no charge made for the service.

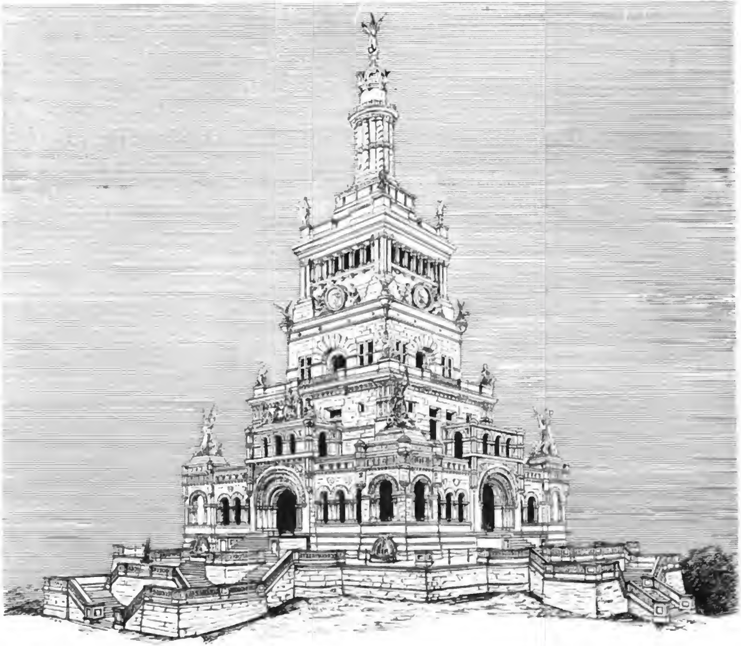
WANTED—Situation as foreman on any kind of cut stone work, best of reference given. Address FOREMAN, this office.

TO LEASE - An equipped granite quarry in Pennsylvania. Plenty of work. Address DR. GREENE, 178 Tremont-st., Boston, Mass.

MARBLE BUSINESS FOR SALE—Old-established business; good reasons for selling; best location in the city. For particulars address, A. J. McMASTER, Lockport, N. Y.

WANTED—Situation—A reliable middle-aged man wishes a steady job to take charge of a business, light cutting, carving, and lettering, and thirty years' experience. Address CARVER, care of STONE.

WANTED—Situation—An experienced man is open to engagements, to take charge or otherwise of granite and marble works. Can estimate, design, model, etc. A. B., 65 Federal St., Providence, R. I.



DESIGN FOR INDIANA STATE SOLDIERS' AND SAILORS' MONUMENT.

By J. L. Wees, St. Louis, Mo.

WANTED—By a thorough, responsible, and well-educated man, position as superintendent in stone quarry, understands the business in every detail, having been brought up at it. Address Box 1 O, Avondale, Essex county, New Jersey.

WANTED—A position as traveling salesman with a wholesale marble, stone or granite house. Am a practical man in the business, and have traveled extensively. During past three years have been soliciting for retailers. Address JOHN G. BLAMPIED, 21 Chestnut street, Albany, N. Y.

WANTED—SITUATION—Good practical carver, draughtsman on monumental, mantel and interior decorations, wainscot, counter and fancy tile plans, etc., wants permanent position in any capacity of trust. Been foreman and superintendent for 25 years. Unexceptionable references. WINTHORP, 20 Douglas-st., Brooklyn N. Y.

GOVERNMENT PROPOSALS.

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C. until 2 o'clock P. M., on the 6th day of April, 1889, for the labor and materials required in the erection and completion of the basement and area walls of the U. S. postoffice, court-house, etc., building at CHARLESTON, S. C. from top of concrete foundations, including first tier of floor beam, etc., in accordance with the specification and drawings, copies of which may be seen at this office, the office of the Superintendent, the Builders' Exchanges, at Baltimore, Md., and Cincinnati, O., the Builders' and Traders' Exchanges, Chicago, Ills. and Louisville, Ky., the Builders' and Dealers' Exchange, Charleston, S. C., the Mechanics' Dealers' and Lumbermens' Exchange, New Orleans, La., and the Virginia Mechanics' Institute, Richmond, Va.

Each bid must be accompanied by a certified check for $400.

The Supervising Architect will furnish a limited number of copies of the specification and drawings at two dollars a set, upon receipt of that sum in postoffice money order drawn to the order of the Treasurer of the United States.

JAS. H. WINDRIM,
Supervising Architect.
March 15, 1889

SEALED PROPOSALS will be received at the office of the Supervising Architect, Treasury Department, Washington, D. C., until 2 o'clock P. M., on the 16th day of April, 1889, for the labor and materials required in the erection and completion of the superstructure above basement walls, of the U. S. custom house, post office and court-house building, at EL PASO, TEXAS, including interior finish and approaches, (heating apparatus and elevator not included) in accordance with the specification and drawings, copies of which may be seen at this office, the office of the Superintendent, the Builders' Exchanges, Baltimore, Md., Cincinnati, O. and Indianapolis, Ind., Builders' and Traders' Exchanges, at Chicago, Ill., Kansas City, Mo., and Louisville, Ky., Mechanics' Dealers' and Lumbermens' Exchange, New Orleans, La., Mechanics' Exchange, St. Louis, Mo., and the Builders' and Dealers' Exchange at Charleston, S. C.

Each bid must be accompanied by a certified check for $500.

The Supervising Architect will furnish a limited number of copies of the specification and drawings at five dollars a set upon receipt of that sum in postoffice money order drawn to the order of Treasurer of the United States.

JAS. H. WINDRIM,
Supervising Architect
March 15, 1889.

FOR SALE—

INGERSOLL CHANNELING MACHINE,

In first-class condition, at a bargain. Apply to

ED. C. FRAW, - - 248 Erie-st., Cleveland, O.

JAMES EVERSON. JOHN C. TEMPLE.

EVERSON & CO.,

—WHOLESALE DEALERS IN—

Brandon Italian, Valido Blue, and Rutland

MARBLE!

OFFICE AND FINISHING WORKS:

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Photos, 10x14, $6 per Dozen.

JAMES COULMAN. M. S. WESTCOTT

COULMAN & WESTCOTT,
Quarrymen and Manufacturers of
Marbleized Slate Mantles,
AND EVERY DESCRIPTION OF SLATE GOODS.
FAIR HAVEN, VT.

ROMONA OOLITIC STONE CO.,
Romona, Ind:
Office: 15 Ingalls Block, Indianapolis, Ind.
OOLITIC (BEDFORD) BUILDING AND BRIDGE STONE,
"BUFF" and "BLUE."

HYDEVILLE MARBLEIZED SLATE MANTEL COMPANY
—Manufacturers of—
ARTISTIC SLATE MANTELS,
Furniture Tops, Art Vestibule Work, Bracket Shelves, Wash Sinks, Bath Tubs Urinals, Grave Boxes, Lamp Bases, Turned Columns.
GRAINED MANTELS, IN IMITATION OF WOOD, A SPECIALTY.
Hydeville, Vt.

RED SLATE!

R. A. HALL,
MANUFACTURER OF
TRIMMED AND SAWED-EDGE ROOFING SLATE.
Hearths, Tile Bordering, Etc.
SLATE DEBRIS GROUND AND BOLTED.

The attention of architects is especially called to its superiority in color and quality for fine private residences and public buildings. Samples sent and information cheerfully given upon application.

Hatch Hill Red Slate Works, Whitehall, N. Y.

Sargent & Murphy, Lessees,

POSTOFFICE ADDRESS
Rutland, Vermont.

ESPERANZA MARBLE COMPANY,
—Producers of and Dealers in the Celebrated—

SAWED, FINISHED OR IN THE BLOCK.

Esperanza Marble!

Building Stone a Specialty. Sills and Lintels always on hand. Correspondence solicited.

NATURAL LIME.

In the bottoms, across the the uplands, through the foothills, and up the mountain spurs runs the lime deposit of the Platte region. This lime deposit (as the *Lyre* has heretofore remarked—good things bearing repetition) comprises the limestone itself, of an excellent quality, and the shell and the soil lime, the two latter valuable varieties being peculiar to the upper Platte region. Here, then, we have three distinct and different limes—distinct in color as well as in character. The lime of the bottoms, or the shell lime, is white; the lime of the uplands, or the soil lime, is grey; while the lime of the foothills and the mountain spur, or the limestone itself, is blue.

The white, or shell lime, occurs from a deposit of shells, decomposed and amalgamated by, probably, the action of countless cycles. These shell deposits are found chiefly in the low and long hills forming the actual banks of the Platte and its tributaries, or comprised in the ground immediately above the water bottoms, and known as "first bench" lands. This shell lime can almost be called in its natural state the lime of commerce and a very pure article at that. It is in fact lime itself, welded into a compact but not hard formation. It is easily pulverized, and such pulverizing is all that is necessary to make actual lime of it.

The lime of the soil, or the grey lime, is largely found in the uplands of the Grand Encampment section. This lime has been lately described at length in the *Lyre* under the heading, "Natural Plaster," a description, by the way, republished in STONE, a journal recognized as the geological organ of the West and South. Suffice it, therefore, to here reiterate that the soil lime of the upper Platte region is the ordinary earth of the uplands, with which has been mixed by the hand of Nature all of the ingredients necessary for the formation of plaster. Water is only to be added to produce ready-made plaster. The ledge of the blue limestone, the best of all limestones, is found in the upper Platte region in a state of more or less perfection. This deposit crops chiefly from the foothills, and its blue if often seen crowning the topmost ridge of the mountain spur. Perhaps the most extensive, and certainly convenient of access, deposit of this blue limestone is on Cedar creek, in the immediate vicinity of the E. E. Bernard ranch, and contiguous to the magnificent marble deposit described in last week's *Lyre*. Here the lime ledges are deep, wide, of the finest quality, and the deposit is only a few miles from Saratoga itself. It is therefore proposed to form a company this spring for the purpose of developing and utilizing this valuable lime deposit. The enterprise, as projected, includes the establishment of several kilns and the erection of a large building in which to store the lime product. The enterprise has a good business look, for these lime ledges are very near to timber, and thus fuel for the kilns and material for the building of the storehouse are both ready and cheap utilization. Lime for Saratoga use can be produced much cheaper by burning it on Cedar creek than it can by burning it nearer town and hauling both the limestone and the wood for the purpose of such burning. In the near future the Cedar creek lime kilns and lime storehouse will be important adjuncts of the growing city of Saratoga.—*Platte Valley Lyre.*

"Where have you passed your vacation?" asked one clerk of another.

"At the beautiful little village of Z."

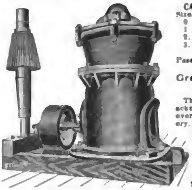
"Is it a healthy locality?"

"Healthy! It is so healthy that in order to start their cemetery they were obliged to assassinate an inhabitant."—*America.*

Too Confident Judge—You are charged with stealing chickens. Uncle Aleck—Yas, boss, dat's so. I did it. I can swar to dat. Jess what I did, shuah.

EXCELSIOR IRON WORKS CO.,
Founders and Machinists,
—Manufacturers of—
Steam Engines, Derrick Irons, Stone Hoisters
Stone Gangs, and
GENERAL QUARRY SUPPLIES.
Cleveland, O.

Ballast and Macadam at Greatly Reduced Prices.
GATES ROCK AND ORE BREAKER!



CAPACITY IN TONS OF 2,000 POUNDS

Size.	Tons per hour	Size.	Tons per hour
0	2 to 4	4	15 to 30
1	4 to 8	5	25 to 40
2	6 to 12	6	30 to 60
3	10 to 20	7	40 to 75
		8	100 to 150

Passing 2½-inch ring, according to character and hardness of material.
Great SAVING in POWER. Adjustable to any Degree of Fineness.
The principle involved in this Breaker is acknowledged to be the greatest success ever introduced into stone breaking machinery. Send for catalogue, containing over 500 references of Contractors, Mine & Railway Companies, Cement Makers, etc.
GATES IRON WORKS,
50 S Clinton-st., CHICAGO U S A.
12 Cortlandt-st., New York, U. S. A.
73 a Queen Victoria-st., E C, London Eng

BAILEY PORTABLE HOIST
STEEL OR IRON,
Has No Equal for
Setting Monuments,
And Such Work.
WE HAVE A LARGE NUMBER OF
Testimonials from Marble Dealers.
For Catalogues address
JAMES DUNN,
51 Rockwell-st., - Cleveland, O.
Thirty days' trial given to responsible parties.

BOSTON & LOCKPORT BLOCK CO.,
(Successors to Bagnall & Loud Block Co., Penfield Block Co.)
FACTORIES:
Boston, Mass. Lockport, N. Y.
This improved Hoist is the most Compact Hoist for setting monuments in the market. One man can always handle it alone.
It is both simple and low priced.
Also manufacturers of
The Best Wire-Rope Block in the Market,
—AND—
LOUD'S DIAPHRAGM HAND POWER PUMP
And Self-Adjusting Roller-Bushed Blocks.
Send for Illustrated Catalogue

WRIGHT & ADAMS CO.,
Quincy Ill.
Hoisting AND Derrick ENGINES.

When writing to Advertisers mention "Stone."

QUARRYMEN!

We are prepared to furnish estimates and plans for handling your product with the most approved appliances.

Write, stating your needs, to

LINK-BELT MACHINERY COMPANY,
CHICAGO, ILL. MINNEAPOLIS, MINN.
—OR TO—
LINK-BELT ENGINEERING COMPANY,
NICETOWN, PHILADELPHIA, PA. NEW YORK, N. Y.

Special Offer!

OUR PATENT

Chilled Iron Shot

are already in almost universal use in sawing stone and rubbing granite, but the finer sizes which can be used with the greatest advantage as a

Substitute for Emery and Corundum,

are comparatively little known and used. In order to increase the general knowledge and appreciation in the trade of the merits of these smaller sizes of shot

WE HEREBY OFFER UNTIL

May 1, 1889,

to send free to any stone dealer in the United States one pound of each of the following sizes—No. 40-50; No. 40-60; No. 50-60; No. 60, or five pounds of any one size securely packed—by express—charges to be paid by the consignee. This will enable

Every Enterprising Stone Dealer

in the country to try our great improvement

AT A MINIMUM EXPENSE.

Give address state, town and county. Write clearly.

Mention "STONE."

SPEED. DURABILITY. ECONOMY.

B. C. & R. A. TILGHMAN,

1118--S. Eleventh-st.--1126
PHILADELPHIA, PA.

PATENT
Chilled Iron Shot
—For Fast—
RUBBING AND SAWING STONE.

Send for Circular.

SAMPLES FREE. TRY FOR YOURSELF.

OVER TEN YEARS' CONSTANT USE.

Saving in Saw Blades, Rubbers and Power Required.

NOTICE!

Our shot have been in regular, constant and increasing use for over ten years and are now used by over five hundred of the most enterprising and leading firms in the country.

With the same machinery and power either saw or rub stone over three times as fast as sand. No expense to try for yourself

See Special Offer!

WARNING!

All persons are hereby cautioned that this process of working stone is our own invention and is protected by Letters Patent which have been sustained in the courts against infringers and that any one using this process without license from us will be vigorously prosecuted.

Information of Infringements

LIBERALLY REWARDED.

S. M. COYKENDALL, President. SAM'L COLES, Treasurer.

UNION BLUESTONE COMPANY,

280 Broadway, New York,--Stewart Building.

This Company is Sole Agent for the sale of the entire production formerly sold by the following Wholesale Dealers in North River and Pennsylvania Bluestone:

BIGELOW BLUESTONE CO., Malden, N. Y.
BURHANS & BRAINARD, Saugerties, "
WELLINGTON PORTER, " "
JOHN MAXWELL'S SONS " "
E. SWEENEY & SONS, Wilbur; "
JULIUS OSTERHOUDT, " "

DANIEL E. DONOVAN, Wilbur, N. Y.
JAMES V. CUMMINGS. " "
CHARLES HOMMEL, " "
ASA BIGELOW KELLOGG, " "
FRANK L. ROGERS & CO., (Successors to Wm B. Fitch) Wilbur, N. Y.

HEWITT BOICE, Rondout, N. Y.
WATSON CRAWFORD, West Camp, "
M. W. STAPLES, Catskill, N. Y.
JOHN N. BRIGGS, Coeymans, N. Y.
KINGSTON BLUESTONE CO., Kingston, N. Y.

Estimates furnished and orders promptly filled. Special attention given to orders for manufactured and cut stone. Orders should be sent direct to this office or given to the Company's Agents.

A LIEN LAW FOR GRAVESTONES.

By the terms of a law recently enacted in the state of New York, persons who furnish gravestones and monuments may have a lien upon the same if they set up a claim for non-payment. It is made the duty of the person who has charge of the graveyard or cemetery to notify the lot owner of the filing of the lien. If the amount due is not paid within six months, the claimant may, at his pleasure, walk into the graveyard, with his tools, machinery, and helpers, and remove the gravestone or monument, and the owners of the cemetery must not say booh to him. The claimant is not to be subject, in his removing operations, to any rules or regulations, but may make as much dirt, cut up as many didos, and do as much mischief as he pleases.

He is not obliged to slick up his leavings, or compensate the cemetery owners for their work in doing so. Some of the stone cutters desire that similar laws should be enacted in other states.

We think it would be better, as a protection to dealers in gravestones and monuments, to pass a law prohibiting them from erecting such structures in any cemetery unless they first file a sworn certificate with the cemetery owners, showing that the stones have been fully paid for and no claims thereon exist.

There is something extremely repulsive in the New York law, which virtually authorizes any noisy or mercenary claimant to break in upon the sacred precincts of a grave and disturb the place of repose of the dead, for the purpose of collecting a disputed debt. The law ought to be corrected or repealed. Surely the claim should be put into the form of a judgment before such outrages are permitted.—*Scientific American.*

FINE SPECIMENS.

There have been placed in the show window of F. H. Chapman & Co.'s drug store some very handsome specimens of statuary marble taken from the quarries of the Corona Marble Co. of Brandon. Among them are five urns showing five varieties of the eight which the quarry will produce. Also some carved roses in bas relief. One includes a calla lily with stalk and leaf, passion stalk with leaves, flowers and bud; the other is a rose with leaf and stem. These pieces are very fine and show the extreme purity and strength of the stone. There are also several styles of wine glasses and card receivers that are worked down to a delicate thickness, and a card six inches long by four inches wide, which bears the company's name, that is worked down to a thirty-second of an inch and is so clear that a newspaper can be read through it. These specimens have been admired by a great many and are pronounced the best ever shown in Rutland.—*Rutland Herald.*

QUARRY PROPERTY PURCHASED.

All the real and personal property of the defunct Esperanza Marble Co. has been purchased by W. R. Albertson of Worcester, Mass., for $155, subject to the mortgages on the property. The first mortgage was for about $22,000 and the second, which included the bonds, is said to have amounted to $33,000.

The purchase of the property includes the machinery, quarry, mill, derricks and other property, except two machines which were recently sold on a chattel mortgage. The property will be known as the Albertson Marble Co., and business will be carried on on a much larger scale than heretofore. It is said that the quarry will be worked at night as well as daytime—*Rutland Herald.*

MT. ASCUTNEY'S GRANITE QUARRIES.

It is stated that the base of Ascutney mountain furnishes an opportunity for the opening up of an immense granite quarry, and is practically inexhaustible. Some three or four different kinds of granite are found there, among which are the pink, green and gray.—*Rutland Herald.*

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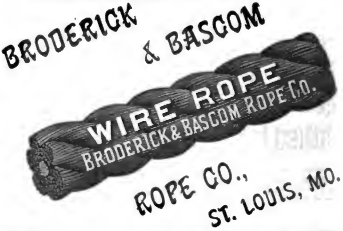

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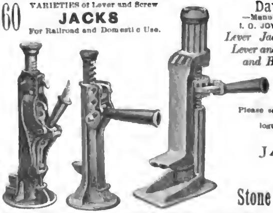

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A Few Copies of the and JUNE, AUGUST and NOVEMBER numbers of "STONE" are wanted to complete our files. We will give a three-months' subscription for each good copy of either of the above numbers sent us

FLEXIBLE STONE.

The Washington, D. C., *Star* says: There lay this morning on the desk of Mr. Samuel Hodgkins, acting chief clerk of the War Department, a stone wrapped in brown paper. It weighed about a pound, and was perhaps thirteen inches in length, two-and-a-half in width, and one-third of an inch thick. The texture of the stone was fine and presented no evidence of stratification, and was smooth over the entire surface. A knife blade made no impression on the particles. There was no doubt as to its being a genuine stone, but it nevertheless possessed the flexibility of a piece of india-rubber. When taken in the hand and shaken in the direction of its flat surfaces, it would bend back and forth with a dull, muffled sound. The movement was more of a laxity in the adhesion apparently than an elasticity. When held horizontally by one end, the other would drop and remain in that position. With the two ends supported on rests, the free centre could be pressed half an inch below the middle line. With one end held firmly on the desk, the other could be bent upward over an inch. The movement was not confined to the one direction—in the plane of the flat surfaces—but the entire stone seemed to be constructed on the principle of an universal joint, with a movement in all directions under pressure. It came from a mountain in North Carolina, and bears the name of "flexible sandstone." The entire mountain is composed of this material, and pieces cut at random exhibit the same flexible properties.

THE SHAH'S STATUE.

The Mohammedan conscience in Persia, says a writer in the *Pall Mall Gazette*, has been sorely troubled about the monument of the Shah Nasr-Eddin. It consists of a statue of the Shah on horseback, life-size, which was cast at the artillery arsenal in Teheran and afterward gilded all over. It was originally intended to be set up in a public square in Teheran, but the clergy of Islam, whose influence throughout Persia is immense, made the Shah understand that the erection of a human figure as a public monument would be universally regarded by the faithful as an act of apostasy.

Any imitation of the human figure is supposed to be an idol, and some enthusiast for the purity of the Mohammedan religion might possibly have been inspired to make an iconoclastic assault upon the effigies of the sovereign. It was conceded, however, that it might be set up as an artistic curiosity in the Shah's own private garden. So there it stands, and it was unveiled with some court solemnity, to which the Puritans or Persian Islam were not invited.

CHINA CEMENT.

Under the name of "shioliao," the Chinese manufacture an excellent kind of cement, which is very suitable for cementing stone, marble, porcelain, and such like materials. For this purpose they take fifty-four parts in weight of slaked lime in powder, six parts of powdered alum, and forty parts of blood, the whole being well mixed until it assumes the form of a thick homogeneous paste. This can, however, be rendered more or less fluid, and is then applied as a coating to any objects which it is desired to render waterproof, and to solidify. Cardboard which has received two or three coatings of this substance becomes as hard as wood. The Chinese use it in its fluid state chiefly for coating oil jars and the outsides of their houses.

The editor of the *Arizona Kicker* says: "If we build in the spring, as we now figure on, we shall put in a marble shop, and furnish gravestones cheaper than has ever been heard of in Arizona. We may also add a grist mill."

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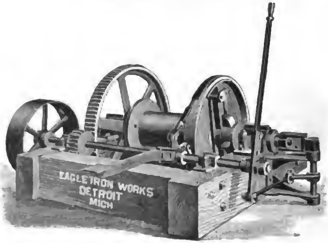

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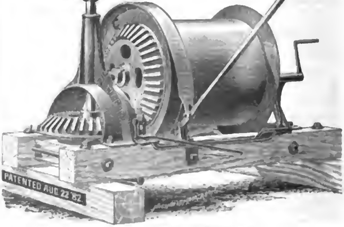
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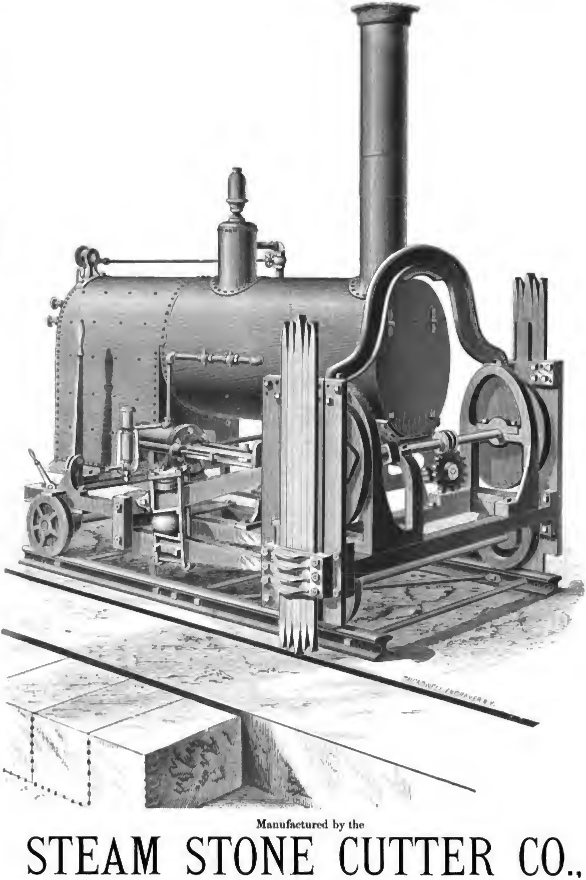

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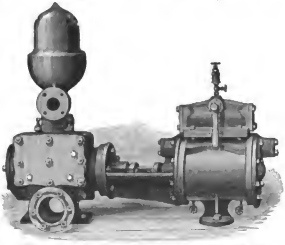

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14 " 4 in.	32
18 " bev'd, under 3¾, 3 ft. and over, long	31
15 in. Curb, 3¾ to 4, 4 ft. and over, long	33
16 " 3¾ to 4, 4 ft. " " "	42
20 " 4 in. thick	45
20 " 5 in. "	55
16 in. Corners, per set	3 50
20 " "	6 50

Special prices given on all axed and jointed curb, according to requirements.

Gutter and Crossings.	
12 in. gutter, 3 to 6½ in	17
12 in. " thin	14
14 in. " 3 to 3½ in. 3 ft. and over, long	20
14 in. " thin, 2.4 and over, long	18
16 in Belgian Bridge, 4 in. thick	44
20 in. " " 4 in thick	55
24 in. " " 4 to 4½ in	65
24 in. " " 5 to 6 in	77
24 in. " " 7 to 8 in	90
19 in. Bridge Flag Joints, 3½ in	28
20 in. " " " 3½ in	40
24 in. " " " 4 in	50
Coping.	
11 in Coping, 2 to 3 in	23
14 " 2½ to 3 in	29
16 " 2½ and under 3½ in	40
16 " 3½ to 4 in	45
18 " 3½ to 4 in	50

20 in. to 36 in. Coping, 4 in. thick, 3½ cents per in. in width When ordered over 4 in. thick, special price will be given.

When ordered under 4 in. thick, 3 cents per in. in width.

Steps.	
6 x 12 in. promiscuous lengths, under 8 ft	50
7 x 12 " " " "	60
8 x 12 " " " "	70
7 x 14 " " " "	70
8 x 14 " " " "	75

8 ft and up to 10 ft. long, add 10 cents per foot.

Rock.	
Promiscuous Rock, per in. in thickness	9
Dimension Rock, per in in thickness	11

Dimension Rock, over 12 in. thick, subject to special price.

All rock over 25 superficial ft. in a stone, 8 to 12 in. thick, see platforms.

For planed Rock, add 25 cents per superficial foot.

Platforms, 4 inches Thick	
Under 20 feet	30
20 feet and under 35 feet	35
35 " " 50 "	50
50 " " 60 "	55
60 " " 70 "	65
70 " " 80 "	75
80 " " 90 "	95
90 " " 100 "	1 20

Over 100 feet, subject to special price

Above, if dimension both ways, add 10 per cent.

For 5 in. add 10 cts.
" 6 " 20
" 7 " 30
" 8 " 40
" 9 " 55
" 10 " 65
" 12 " 100

For planing add 23 cents per superficial foot.

For rubbing add 35 cents per superficial foot.

For planing both sides add 50 cents per superficial foot.

Rubbed Sills.	
4x8 in.	48
5x8 in.	50
5x9 in	60
5x12 in	77

⅛ in allowance in thickness.

Rubbed Lintels.	
3½ to 4 x 10½ in. under 8 ft.	48
8 ft. and under 10 ft.	60
4 in. x 12 in. under 8 ft. in length.	67
Rubbed Curb,	
2½ x 8 in. promiscuous lengths	30
2½ x 10 in. " "	35
3 in. and under 3½ x 12 in. promis. length	42
12 in. Curb, selected for lintels, 3½ to 4 in	48
12 " " " " 4 in.	55
Rubbed Mantels.	
4 x 10 in	55
4 x 12 in	65
4 x 14 in	75

Dimension lengths with heads, measure heads.

Rubbed Hearths	
3 to 3.6 in. long, 1.4 to 1.8 in wide	28
Over 3.6 to 4 6 in. long, 1.4 to 2 ft. wide	33
" 4 6 to 5 6 " 1.4 to 2.6 in wide	40
" 5.6 to 6 6 " 1.4 to 3 ft. wide	45
" 5.6 and under 8 ft long. 3 to 4 ft. wide	65
Rubbed and Jointed Tile,—Boned.	
Under 2½ in. thick, 12 to 30 in. square, per superficial ft	55

Half tile counted as whole.

When tile is fitted to plan with ½ tile and border, special price given.

Rubbed and Planed Flag—Unjointed.	
3 ft. and 3 ft. 6 in., 1 ft. 6 in. and over wide	34
4 ft. and 4 ft. 3 in., 3 ft. wide and over	67
5 " 5 " 6 " 2 " "	39
8 " 8 " 6 " 2 " "	42

Any of the above flag ordered 3 in. thick, or extra requirement as to width, subject to special price.

Planed and Axed Headers.

4 to 12 in. thick, with heads cut on one or both ends, subject to special price.

Platforms, Steps, Ashler and all kinds of trimmings for buildings, special prices given.

Cemetery and Hitching Posts.

All manner of turned and moulded work, special prices given.

Special prices made on engine beds, pier caps, bond stone beam blocks, broken out in rough or finished, ready for setting.

Trade discounts on application.

BROWNSTONE.

(Lord & Griswold, Chicago.)

[All quotations f. o. b. quarry, unless otherwise mentioned.]

	Cu. ft.	
Carbondale, light	70c.	f. o. b. quarry
" dark	95	" "
Hummelstown	45	" "
Lake Superior { Marquette	1 00	" Chicago
Lake Superior { Rain Drop	1 00	" "
Trenton	50	
Linden	50	
New Brunswick	45	
Kibbie—Massachusetts	65	
New England Brownstone Co., Connecticut	90c	
Chicago & Ind. "	45c	

OHIO BROWNSTONE—

	Cu. ft.
Killbuck	45c
Gann	45c
No. 1. Promiscuous blocks	45c
No. 2. " "	30

Stone ordered to dimension sizes 10 cents per cubic foot extra

Window Caps and Sills, broken and split to size, 75 cents per cubic foot.

BROWNSTONE—CONNECTICUT

(New England Brownstone Co., Cromwell, Conn.)

	Cu ft.
Blocks, promiscuous sizes	$ 95
Blocks, Posts, Lintels, etc., under 15 cu. ft. to dimensions	1 00
Blocks, Posts, Lintels, etc, 15 and under 30 cu. ft., to dimensions	1 10
Blocks, Posts, Lintels, etc., 30 and under 40 cu. ft., to dimensions.	1 20
Blocks, Posts, Lintels, etc., 40 cubic feet and over, price to be agreed upon.	
Blocks, No. 2 promiscuous sizes	85
Block, Posts, Lintels etc., No. 2 under 15 cu. ft. to dimensions	85
Blocks, Posts, Lintels, etc., No. 2, 15 and under 30 cu. ft. to dimensions	90
Blocks, Posts, Lintels, etc., No. 2, 30, and under 40 cu. ft. to dimensions.	95
Blocks, Post, Lintels, etc, No. 2, 40 cu. ft. and over, price to be agreed upon.	
	Superficial
Door sills under 2 ft. wide, 6 in. thick, one edge under 7 ft long, promiscuous sizes	63
Platforms, Cornice, etc, 7 to 8 in. thick, under 12 superficial foot	85
Platform, Cornice, etc, 12 and under 24 superficial ft.	1 00
" " etc., 24 " " 32 " ft.	12
" " etc., 32 superficial feet and over, price to be agreed upon	
Area Ashlar, under 4 in. thick	90
Flag	30
Window Stuff, promiscuous sizes	40
	Lineal.
Water Table, 7 to 8 in. square, promiscuous lengths	60
Area Steps, 10 to 12 in. wide, under 3 ft. long, promiscuous lengths	50
Coping, 12 by 2 in. promiscuous lengths	33
Steps. Lintels. etc., 14 and under 18 in. wide, 8 in. thick. and under 7 ft. long	85
Steps, Lintels, etc., 14 and under 18 in. wide, 6 in. thick, 7 and under 8 ft. long	95
Steps. Lintels, etc., 14 and under 18 in. wide, 8 in. thick, 8 and under 10 ft. long	1 05
Steps, Lintels etc., 10 ft long and over, price to be agreed upon	
Monumental Stone, under 10 cu. ft.	1 30
" " 10 and under 20 cu. ft.	1 50
" " 20 cu. ft. and over, price to be agreed upon.	

Monumental Stone, 8 to 12 in. thick, charged 12 in.

Sockets, under 12 in. wide, and under 8 in. thick	30
" under 14 in. wide, and under 10 in thick	68

We assume no risks for damage to stone by frost after shipment.

Terms—Cash on delivery, with a discount of 2 per cent.; or approved Notes, at two months. Interest to be charged on all time over two months.

FREESTONE.

(Lord & Griswold, Chicago.)

New Brunswick brown	.45c
Buena Vista	.40
Ohio	.30
Long meadow, brown	.60

GRANITE.

(Lord & Griswold, Chicago.)

Westerly	
Monson	.65c
Woodstock	.65c
Mica Stone	.50c
Port Deposit	.65c
Lenthold Red, Monumental and Building stock	.65c to $1 00

GREEN STONE.

(Lord & Griswold, Chicago.)

Pennsylvania	.50c

LIME, CEMENT, ETC.

(Indianapolis Lime Association.)

Huntington lime in bulk, per bushel of 70 lbs	$	28
" " " new barrels per barrel		95
Newark plaster paris, or stucco, " "		2 25
Michigan " " " " " "		2 25
Louisville cement, " "		1 50
" " in paper sacks, per sack		50
Portland " imported, " barrel		3 75
White sand, (New Orleans) " "		3 00
Plastering hair, washed, in 1 bushel papers, per bushe		30
" " limed, " 1 " " " "		
Fire brick Savage per 100		
" " Aetna " "		4
" " Montezuma " "		3 50
" " West Virginia " "		6 00
Ground fire clay, best, per bushel		1 00
" " " common " "		

Discounts	
Vitrified sewer pipe,	50 per cent.
Flue Pipe, for Chimneys	25 " "
Terra Cotta Chimney Tops	25

LIMESTONE.

(Lord & Griswold, Chicago.)

	Cu. ft.
Salem, oolitic	25c f. o. b. quarry.
Bedford, oolitic, buff	25 " "
Stinesville, " blue	35 " "
Warrensburg, Mo	25 " "
Stone City, Iowa	20 " "
Kasota	25 " "
Oolitic Bowling Green	25 " "
Artesian	35 " "
Grafton	35 " "

MAGNESIAN—

(J. A. Green, Stone City Iowa.)

Dimension Stone —(First Quality of all ordinary sizes.)

12 inches and over, per cubic foot	$ 35
11 to 13 inches, per superficial foot	30
9 to 10 " " " "	27
7 to 8 " " " "	25
6 inches, per superficial foot	20
5 " " " "	17

Vault covers—(Large size.)

7 to 8 inches thick, per square foot	$ 30
6 to 7 " " " " "	25

Flagging Stone—(Ordinary size.)

5 inches thick, per square foot	$ 17
4 " " " " "	13
3 " " " " "	10

Bridge Stone.

Common, per cubic yard	$ 2 50
Coppings, " " "	5 75
Pedestal Bases, per cubic yard	6 75

Footing Stone.

Dimensions, per cubic yard	$ 3 25
Common, " " "	2 50

Rubble or Building Stone.

Common Rubble, Per 100 lbs	3½c
Select Rubble, " 100 "	3½
Block Rubble, " 100 "	4
Drilled Rubble, " 100 "	8

Street Crossings.

5 to 6 inches, per superficial foot	$ 15
Curbing, 5 to 6 inches thick, per superfical ft.	15

Cut and Rubbed Stone—(Finished Ready to lay in their place.)

Ashlars per sq. ft. measuring all that shows	$ 60
Base	70

Corner Blocks.

Platforms, per superficial foot	60

Estimates for Shipment.

The following estimates will give parties not acquainted with the stone business an idea of the proximate amount of the different kinds of stone necessary to constitute a car load weighing 24,000 lbs.:

6 cubic yds. or 162 cubic feet Dimension Stone.
520 to 600 superficial feet Flagging 3 inches thick.
450 to 500 " " " 4 " "
350 to 400 " " " 5 " "
300 to 325 " " " 6 " "
225 to 250 " " " 8 " "

8 perch of Rubble stone, or 200 cubic feet.

A perch of stone in Iowa is 25 cubic feet, unless otherwise agreed on, 25 feet being by law a state perch, yet 16½ feet prevails in many places.

(Lord & Griswold, Chicago.)

JOLIET	Rubble, $4 cord; dimension 20c
Planed sidewalk, Chicago	64c

ELLETISVILLE—

(Matthews Bros.)

Rough Blocks	25c
Dimension	35
Mounmental	40@65
Sawed	50@100

ELLETTSVILLE—

(Perry Bros.)

Mill Blocks	25c
Dimension	35
Mounmental	40@65
Sawed	50@100

OOLITIC, STINESVILLE—

(Terre Haute Stone Works Co.)

Ashlar Sawed, Two Sides—Superficial.

Inches		Inches	
2	18	9	45
3	20	10	50
4	23	11	55
5	26	12	60
6	30		65
7	35	14	70
8	40	15	75

Stone over 10 feet long and 4 ft wide, 5 cts, per superficial foot extra.

Rough Stone.

Mill Blocks as quarried, per cu ft.	25c
Dimension Mill Blocks, per cu. ft.	30
Monument and Headstone Bases, per cu. ft.	35
Extra Clear Stone for Statuary, etc	50
All Bases less than one cubic foot each	30
Rough Black Slabs, 2 to 3 inches thick, per superficial foot	8

Promiscuous Rough Black Slabs, 4 to 6 inches thick, and End of Sawed Stones, $40 per car load.

Bridge Stone.

Dimension Bridg Stone, per cu. ft.	15c
Promiscuous good select Bridge Stone, cu ft.	10
Common Bridge Stone Backing	$7 per car.
Common Rubble, all sizes,	5 " "

Good Range Rubble, from 6 to 8 inches thick, and 8 to 12 inches on bed, suitable for dressed rock faced work, $10 per car load.

Regular discount, rough 10 per ct., sawed, 20 per ct.

Cash discount 3 per ct., on rough and dimension, and 5 per ct. on sawed.

KASOTA PINK OR WHITE—

(Kasota Quarry Co. Kasota, Minn.)

9 inches thick cubic measure	35c
9 " " superficial "	30
8 " " " "	28
7 " " " "	26
6 " " " "	25
5 " " " "	20
4 " " " "	15
3 " " " "	13

Lineal measure.

Stone 9x9	25
Stone 9x8	24
Stone 9x7	23
Stone 9x6	21
Stone 9x5	19
Stone 8x8	23
Stone 8x7	21
Stone 8x6	20
Stone 8x5	18
Stone 7x7	20
Stone 7x6	19
Stone 7x5	17
Stone 6x6	17
Stone 6x5	17
Range Stone 12 inches thick	22
" " 10 " "	18
" " 9 " "	16
" " 8 " "	14
" " 7 " "	13

Common Rubble or Cord Stone $3.00 per cord.

Footing Stone.

10 to 12 inches thick superficial measure	12½
7 to 9 " " " "	10

The above drilled to size one way only.

Dimension Footing.

10 to 13 inches thick superficial measure	15
7 to 9 " " " "	12

Drilled to size both ways.

Bridge Stone.

$3 to $4.50	per cubic yard.

Rip-Rap.

$1 to $2.50	per car load.

MARBLE.

(Vermont Marble Co., Proctor, Vt.)

RUTLAND MARBLE—

1888	Superficial						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental
Statuary	90	1 15		1 35	2 00	2 70	4 60
No. 1	75	90		1 10	1 65	2 20	7 00
Average	60	70	Same as 2 inch	80	1 20	1 60	5 50
No. 2	40	45		60	90	1 20	4 50
Rutland Italian	30	35		55	82	1 10	4 25
Mottled Smith	...	...		40	60	80	3 50
Best No. 3	27	32		35	62	70	3 00
No. 3	20	32		25	37	50	2 00
Extra dark and mottled blue	40	50		60	90	1 20	4 50
Dark blue	30	35		50	75	1 00	3 50
Light blue	20	25		30	45	60	3 50

URN LIST—

In Rutland, Sutherland Falls, Mountain Dark and Italian.

Height in inches.	Diam. Bowl in inches.	Rutland Average. S. F., M. V. Mount Dk.	R'l'd No.2 ex.dk blue Sutherland Falls No. 1 Mountain Dark Av.	Rutland Mottled S. Rutland Dk. Blue. Sutherland Falls Av. Mountain Dark No 2	Rutland Best No. 3 Sutherland Falls No. 3	Rutland Light Blue. Suth'l'd F. Best No. 3 M. Dk. No. 3.
7	4	2 60	2 50	2 40	2 30	2 20
8	5	2 80	2 70	2 60	2 50	2 40
9	5	3 00	2 90	2 80	2 70	2 50
10	5	3 0	3 10	3 00	2 90	2 80
10	6	3 60	3 40	3 20	3 10	3 00
12	6	4 10	3 90	3 70	3 50	3 40
13	6	4 30	4 10	3 90	3 70	3 50
14	6	4 60	4 30	4 00	3 80	3 60
12	7	4 90	4 60	4 30	4 10	3 90
13	7	5 10	4 80	4 50	4 30	4 10
14	7	5 40	5 00	4 70	4 40	4 20
15	7	5 60	5 20	4 90	4 60	4 40
16	7	5 80	5 40	5 10	4 80	4 60
14	8	6 70	6 20	5 80	5 40	5 20
15	8	7 00	6 40	6 90	5 50	5 30
16	8	7 20	6 60	6 20	5 70	5 40
18	8	7 60	7 00	6 50	6 00	5 60
16	9	8 30	7 60	7 00	6 50	6 10
17	9	8 70	7 90	7 20	6 70	6 20
18	9	9 00	8 0	7 50	7 90	6 50
20	9	9 79	8 80	8 10	7 40	6 90
18	10	10 60	9 60	8 70	8 00	7 20
20	10	11 40	10 30	9 40	8 60	7 80
22	10	12 20	11 30	10 00	9 10	8 50
24	10	13 00	11 70	10 60	9 60	8 80
20	11	13 70	12 50	11 30	10 30	9 50
22	11	14 50	13 10	11 90	10 80	10 00
24	11	15 40	13 80	12 50	11 30	10 40
20	12	15 90	14 30	13 00	11 80	10 90
22	12	16 80	15 10	13 60	12 20	11 30
24	12	17 80	15 90	14 30	12 90	11 80
26	12	18 70	16 70	15 00	13 40	12 20
28	12	19 70	17 50	15 60	14 00	12 70
24	13	20 20	18 00	16 10	14 50	13 20
26	13	21 60	19 10	17 00	15 20	13 80
28	13	22 80	20 30	18 00	16 10	14 60
24	14	24 00	22 00	19 90	17 90	16 40
28	14	28 00	25 00	22 40	20 30	18 50
6	14	29 50	26 50	23 70	21 30	19 50

Hearths, 1 in., sawed edges, per sup. foot	$ 20
No. 3 Base strips and posts, cubic foot	1 50
Inferior No. 3 posts and strips "	1 25
" No. 3 bottom bases "	1 25
" blue posts, strips and bottom bases	1 75
Markers, assorted sizes, 10 to 14 in. long, 3 in.	70
" " " 4 "	1 00
Footstones, 5 to 8 in., each	30
" sawed heads, each	32
" " sand rub and box	38

SUTHERLAND FALLS MARBLE—

1888	Superficial.						Cu.
	1 in.	1¼ in.	1½ in.	2 in.	3 in.	4 in.	Monumental.
Mourning veins	50	62	80	85	1 25	1 70	5 00
No. 1	40	55	75	80	1 20	1 60	4 50
Average	35	45	55	60	90	1 20	3 50
No 2	25	30	35	40	60	80	2 75
Best No. 3	20	25	28	30	45	60	2 25
No. 3	18	22	22	25	37	50	2 00

No. 3 Base Strips and Posts, per cubic ft.	$1 50
Inferior No. 3, Posts and Strips, per cubic foot	1 25
Inferior No. 3 Bottom Bases	1 25
Markers 12 to 14 in. long, 3 inches thick each	35
do 12 to 14 " " 4 " " "	50
do 16 to 18 " " 3 " " "	75
do 16 to 18 " " 4 " " "	1 00
Footstones, 5 to 8 inches wide, 2 inches thick each	20
Footstones, sawed heads, each	22
Footstones, sawed heads, sand rub, and box, each	28
Hearths, 1 inch, sawed edges, per sup. ft.	20

ITALIAN MARBLE—

	Cu. ft.
Monumental stock	$4 75
Slabs over 2 in. thick, full size of block	4 35
" 2 " cut to size	4 75

Superficial—

	Full size.	Cut to size
¾ in. slabs,	$0 37	$0 47
1 "	46	56
1¼ "	48	58
1½ "	60	70
2 "	78	88

Add for freight per cubic foot.

MOUNTAIN DARK MARBLE—

1888	Superficial.					Cu.
	¾ in.	1¼ in.	2 in.	3 in.	4 in.	Monumental.
No 1	60	70	1 00	1 50	2 00	5 90
Average	40	60	80	1 20	1 60	4 90
No 2	32	42	60	90	1 20	3 90
No 3	22	30	45	68	90	2 90

Inferior No. 3, Bottom Bases, per cu. ft.	$2 15
Inferior No 3, Strips and Posts, per cu. ft.	2 15
Markers, 10 to 14 inches long, 3 inches thick, each	35
do 10 to 14 " " 4 " " "	50
do 16 to 18 " " 3 " " "	75
do 16 to 18 " " 4 " " "	1 00

SPECIALS—

Diminished Dies, extra........per cubic foot	50c
Strips ordered 7 ft. long and over, extra per cubic foot.	50
Sawing edges slabs, 1 inch thick per superficial ft.	03
" " " 2 " " "	06
" " " 3 " " "	08
" " " 4 " " "	10

Charges for sawing ends of slabs the same as for sawing edges.

Rutland Headstones, ordered with sawed edges, will be charged extra as above.

SAND RUBBING—

Monumental Stock ....per cubic foot	35c
Headstones, 2, 3 and 4 inch, rubbed sides, per surface foot	05
Headstones ordered rubbed edges, extra per 2 inch superficial foot	05
Hearths..........per surface foot rubbed	06

POLISHING MATERIALS—

California Putty	per lb.	$0 75
Putty, first quality	"	65
" " " 25 lb. boxes	"	60
Scotch Hone	"	15
Pumice Stone, selected	by bbl.	12
" " " small lots,		15
Sponges, first qual. sheepswool	per lb.	1 50
Red Grit	"	03
Nova Scotia Blue Grit	"	04
Common Coarse Grit	"	02
Oxalic Acid	"	15
Sand	per bbl.	2 00
Cloth, 5½ in. wide	per yd.	6 00

TOOLS—

¼ in. Mallet or Hammer Heads,	per doz.	$1 25
5-16 " " " "	"	1 50
⅜ " " " "	"	1 75
½ " " " "	"	2 25
⅝ " " " "	"	3 00
Tools over ⅝ in.	per lb.	35
Frosting Tools	each	52
Drill Stock, iron pulley	"	6 00
Drill Bow String, Wire covered	"	25
" " oval	"	1 50
Drills	per doz.	2 50

BEST HICKORY MALLETS—

2 to 3 lb.	each,	$ 67
3½ to 4½ lb	"	1 00
5 lb.	"	1 25
6 lb.	"	1 50
7 lb.	"	1 75
8 lb.	"	2 00

BRANCHES—

Boston Marble Co., 8 Thacher-st.
Philadelphia Marble Co., 201 South 30th-st.
Cleveland Marble Co., 179 Merwin-st.
Toledo Marble Co., 10 Lafayette-st.
Detroit Marble Co., 378 Woodbridge-st., West.
Chicago Marble Co., East End Michigan-st.
Vermont Marble Co., (St. Louis Branch) Cor. 11th and Spruce Sts.
San Francisco Branch (Vt. M. Co.) 244 Brannan St.

TRUE BLUE MARBLE—
[True Blue Marble Co., West Rutland, Vt.]

1888.	Superficial in.							Monumental.
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Dark Veined Blue	22	28	35	40	45	....	....	3 00
Dark Mottled Blue	30	35	40	55	65	....	....	4 00
Ex. Dk. Veined Blue	30	35	40	55	55	....	....	4 00
Ex. Dk. Mottled Blue	40	46	55	70	70	....	....	5 00

Dark blueposts, per cubic foot	$1 06
Dark blue bottom bases ... per cubic foot	1 65
Rutland Inferior No. 3 bottom bases per cubic foot	1 25
Dark blue markers, 0.10 to 1.2 long, 3 in. thick each	50
Dark blue markers, 0.10 to 1.2 long, 4 in. thick, each	75
Dark blue foot stones, 5 to 8 in wide, assorted sizes each	20
Dark blue foot stones, same sizes, sawed heads, each	22
Dark blue foot stones, same sizes, sawed heads and rubbed and boxed, each	28
Diminished dies, extra ... cubic foot	50
Strips ordered 7.0 long and over, extra per cubic foot	50
Broken and under sized slabs, ⅞, 1, and 1¼ in. thick, containing from 2 to 12 feet, in car load lots, but without car load discounts, per net ton	10 00
Sand rubbing ... per cubic foot	35
Boxing ... " "	25

(Lord & Griswold, Chicago.)

Tennessee Red	$2 50@3 00	f. o. b. Chicago
" Knoxville	3 00	" "
Vermont White	2 50@ 3 00	" "
Ophite	4 50@ 5 00	" "
Armodita	1 50	" "

GEORGIA MARBLE—
[The Blue Ridge Marble Company Cincinnati, O.]
Monumental Stock and Slabs over two inches thick, cut to size.

	Cubic foot. At Nelson	At Cincinnati
Kennesaw, selected	$5 50	$5 85
Kennesaw, average	5 00	5 35
Etowah, selected	4 50	4 85
Etowah, average	3 75	4 10
Creole, extra dark mottled	4 00	4 35
Creole, dark mottled	3 50	3 85
Creole, medium cloud	3 00	3 35
Creole, second quality	2 50	2 85
Cherokee, selected	3 25	3 60
Cherokee, average	2 75	3 10
No. 2 base Strips and Posts	1 60	1 95
Inferior No. 2 Posts and strips	1 35	1 70
Inferior No. 2 Bottom Bases	1 25	1 60
Markers, 10 to 14 inches long, 3 inches thick, each	35	45
Markers, 12 to 14 inches long, 4 inches thick, each	50	65
Markers, 16 to 18 inches long, 3 inches thick, each	75	65
Markers, 16 to 18 inches long, 4 inches thick, each	1 00	1 30
Foot Stones, 5 to 8 inches wide, 2 inches thick, each	20	23
Foot Stones, sawed heads	22	30
Foot Stones, sawed heads, sand rubbed and boxed	26	33
	Supr. ft.	Supr. ft.
Hearths 1 inch thick, sawed edges	20	25
Bottom Slabs and Flagging, 2 inch, sawed edges	30	35
	Cu. ft.	Cu. ft.
Diminished Dies, extra	60	60
Stripe ordered, 2 feet long or over, extra	50	50

Urn list, sent on application.

ESPERANZA BLUE MARBLE.—
(Sargent & Murphy, Rutland, Vt.)

Extra dark veined	$4 50
Dark blue	3 50

MACHINERY.

CRAB WINCHES.
[Phoenix Iron Works, Cleveland, O.]

	Diameter.	Length.	Lifting, Capacity.	Changes of speed.	Price.
1	4½ inches	12 inches	2,000 lbs.	One.	$75 00
2	5 "	15 "	4,000 "	Two	85 00
3	6 "	20 "	8,000 "	"	125 00

PORTABLE FORGES.
[Bullock Bellows & Forge Co. Cleveland, O.]

No. 1	Bellows 18 in.	$20 00
No. 2	" 20"	25 00
No. 3	" 22	30 00

Discount 20 per cent.

[Buffalo Forge Co., Buffalo, N. Y.]

No. 0	Hearth 28x40, fan 14 in. without water tank	$50 00
" 0	" " " " with "	54 00
" 1	" 21x27, " 10 with hood	40 00

Discount 60 per cent.

(Star Machine Co., Buffalo, N. Y.)

No. 5	Hearth 21-inch, fan 8 inches, with dash	$24 00
" 7	" 24x30 " 10 " with half-open hood	40 00
" 8	" 24x30 " 10 " with dash	27 00

Discount 40 per cent

QUARRY SUPPLIES.

BLOCKS AND TACKLE—
(Boston & Lockport Block Co., Boston.)

Thick Mortise Blocks.	Single	Double	Triple
8 inch iron-bushed	2 40	4 20	6 00
10 " "	3 20	5 80	8 50
12 " "	4 50	8 00	11 50
14 " "	6 75	10 50	14 00
16 " "	9 00	16 50	24 00
18 " "	15 00	24 00	48 00
20 " "	21 00	32 00	45 00
8 inch roller-bushed	3 25	6 00	8 50
10 " "	4 25	8 00	11 50
12 " "	[illegible]	10 50	[illegible]
14 " "	[illegible]	14 50	19 00
16 " "	10 75	19 50	29 00
18 " "	18 00	23 00	46 00
20 " "	25 00	43 00	60 00
Steel Tackle Blocks	Single	Double	Triple
6 inch	1 25	2 25	3 40
8 "	1 90	2 50	3 00
12 "	4 00	7 00	9 00
14 "	5 00	8 50	12 00

Iron-bushed, discount 20 per cent.; self-adjusting roller-bushed discount 30 per cent.

PATENT CHILLED IRON GLOBULES—
(B. C. & R. A. Tilghman, Philadelphia, Pa.)

Until further notice, our Patent Chilled Iron Globules will be supplied f. o. b. in Philadelphia (in 100-lb. bags only) at the following rates per bag:—

No. (12-14)	$15	No. (30-40)	$9
" (14-22)	13	" (40-50)	8
" (14-30)	12	" (50-60)	7
" (22-30)	10	" (30-60)	7
		" (60)	4

When specially ordered, bags will be boxed for increased security, at 20 cts each extra.

Half and Quarter Bags, at 1 ct. per lb. extra, sent only by express.

All transportation at cost and risk of consignee, who must specify in order any preferred route.

Terms:—Cash.

Discount on Cash orders of 5 bags ... 3 per cent.
" " " 10 " ... 5 "
" " " 20 " ... 7 "

WIRE ROPE—
(A. Leschen & Sons Rope Co., St. Louis.)

	Discount
Steel "Hercules"	42½ per ct.
Steel	42½ "
Gal. Iron	30 "
Iron	35 "
Wire Rope Blocks	25 "

(Washburn & Moen M'f'g. Co.)

Iron	35
Steel	42½
Gal. Iron	25

WHEELBARROWS—
(Lansing Wheelbarrow Co.)

	Doz.
Common, nailed	14 00
Patent bolted	20 00
Red oak	30 00
Bent handle stone	32 00

BLASTING MATERIAL.—
(For Customers of the Ingersoll Rock Drill Co. only)

Magneto-Electric Blasting Machine, No. 3	$25.00
" " " (larger) No. 4	50.00

Discount 7½ per cent.

Platinum Fuses—Cotton Covered
(50 in a bundle.)

4 feet, wires	per 100 Fuses.	$3.00
6 " "	"	3.54
8 " "	"	4.08
10 " "	"	4.62
12 " "	"	5.16
14 " "	"	5.70
16 " "	"	6.24
18 " "	"	6.78
20 " "	"	7.32

Discount 10 per cent.

Fuses with longer wires at the rates of ⅓ of one cent, per foot, additional—a double cover being necessary for long fuses.

Leading Wire, Cotton Covered ... 1 c. per foot.
Discount 15 per cent.
Connecting Wire, Cotton Covered ... 40 c. per lb.
Discount 7½ per cent.

RED SANDSTONE.

(Lord & Griswold, Chicago.)
[All quotations f. o. b. quarry, except otherwise mentioned.]

	Cu. ft.
Portage	60c
Dunreith, red	75c
" variegated	35c
Darlington	40
McArthur	65
Carlisle	65
Potomac	50

SANDSTONE.

(Cleveland Stone Co.)
[All quotations f. o. b. quarry unless otherwise specified.]

BUFF AMHERST—

	Cu. ft.
No. 1 Promiscuous block	50c
No. 2 " "	40

BEREA AND BLUE AMHERST—

No. 1 Promiscuous Blocks	40c
No. 2 " "	30
No. 1 Monument Bases, broken to size	45
No. 2 " " " "	35
Pier Blocks " "	30

SPLIT FLAGGING—

	Sq. ft.
2 inches thick, 6 feet long and under	07c
4 " " " 6 " "	09c

SAWED STONE—
(Buff Amherst, Berea and Blue Amherst—special prices on large lots.)

ASHLAR—

	Sq. ft.
3 in. Buff Amherst	25c
6 " " "	46
9 " " "	68
12 " " "	88
3 in. Berea or Blue Amherst	21
6 " " " "	41
12 " " " "	77

BEREA AND BLUE AMHERST SAWED FLAGGING—

2 inches thick	10
2½ " "	12
3 " "	14
4 " "	18

SPLIT PLATFORMS—

	Superficial feet. 5 in.	12 in.
No 1 Buff Amherst	25c	60c
No. 2 " "	20c	40
No. 1 Berea or Blue Amherst	20c	50
No. 2 " " "	17c	40
No. 3 " " " (for sidewalks, 12½c)		30

Intermediate thicknesses proportionate rates.

Branch Offices—
Sleeper-st., Boston, Mass. 119 LaSalle-st., Chicago, Ill.
2024 N. Broadway, St. Louis 407 Walnut st., Philad'a, Pa
McClintock Bldg., Pittsburg. 241 Broadway, New York.

(Haldeman Stone Co., Cleveland, O.)

BLUE AMHERST—

	Cu. ft.
No. 1	35c
No. 2	25

(Babbitt Sandstone Co., Ypsilanti, Mich.)
Brown Sandstone ... 25 f. o. b. quarry

(French Fort Quarry, New Castle, N. B.)

Light greenish sandstone No. 1	45c
" " No. 2	30c
Railway Stone, cu. yd	[illegible]
Shoddy, 3 to 6 in. rise, sup. yd	10 5

(Lake Huron Stone Co., Detroit, Mich.)
Blue Sandstone ... 30c f. o. b.

SLATE.

(Henry Fulmer, Easton, Pa.)
F. O. B. Slatington, Pa.

PENNSYLVANIA BLUE BLACK SLATE BLACKBOARDS.

	sq. ft
2½ foot wide	16c
3 " "	18
3½ " "	19
4 " "	22

Mantel stock as it runs through 18 cents square foot in car lots.

ROOFING SLATE—

Size.	No. in sq.		Size.	No. in sq.	
14x24	98	$3 50	10x18	192	$3 7
13x24	106		9x18	214	
12x24	115		10x16	222	
13x22	127		9x16	247	
11x22	138		8x16	277	
11x20	155		10x14	262	
10x20	170		8x14	328	
			7x14	375	
			8x12	400	
			7x12	458	
			6x12	534	

[Coolman & Westcott Fairhaven Vt.]
Vermont Milled Slate.

	Sup. foot
Mantel Stock	17
Fire Boards	17
Register Frames, jigged	24
Hearths	17
For rubbing both faces of above, excepting caps and trussers extra	02
Any of the above unrubbed less	01
Steps, to 5 ft. in length	20
Steps, 5 ft. to 8 ft. "	23
Steps larger	special
Platforms to 16 sup. ft.	20
" 16 to 22 " "	25
" 22 to 28 " "	30
" Larger	special

Prices for steps and platforms include one-face rubbed and one edge nosed or chamfered

Urinal Slabs, squared and faced, sup. foot	22
Urinal Slabs, additional work " "	special
Laundry Tub Slabs, to shape but not grooved sup. ft.	22
Laundry Tub complete, set up, 2 compartments crated	$14 00
Laundry Tub complete, set up, 3 compartments, crated,	$19 00
Larger than standard compartments or more of them,	special
Wainscoting, sup. ft.	20
Black Boards, ⅜ to ½ up to 3 ft. wide, crated sup. ft.	18
Black Boards, 3 ft. to 3½ ft. wide, crated, sup. ft	20
Black Boards, 3½ ft. to 4 ft. wide crated, " "	22
Thresholds to 5 ft. in length " "	20
" 5 ft. to 8 ft. " " "	25
Carriers' Slabs, faced one side crated, " "	30
Carriers' Slabs, faced two sides, crated, " "	34
Billiard Table Beds, crated, " "	22
Imposing Stones, " "	30
Grave Covers, sawn and planed only, and in two or more pieces. " "	16
Grave Boxes, rabbeted ends, " "	30
Sills, Lintels, Watertables and other building work for each 1 inch in thickness, " "	16
Miscellaneous Slabs, including vault slabs, to be rubbed same as hearths, up to 16 sup. ft. " "	20
16 to 22 " "	25
22 to 28 " "	30

Vermont Red	$13 50	f. o. b. Chicago
" Purple	5 50	" "
" Green	5 50	" "

SEA GREEN—
(Griffith & Nathaniel, Poultney, Vt.)

7x12, 7x14, 8x12, 9x12	$2 40	f. o. b.
8x14, 9x14, 10x14, 12x15, 15x20	2 65	"
8x16, 9x16, 10x16, 12x16, 12x20, 12x22, 12x24, 14x24	2 75	"
9x18, 10x18, 10x20, 11x22	2 85	"

Vermont Slate Trust prices same

BLUE-BLACK—

Virginia	$6 00	f. o. b. Chicago.
Peach Bottom		" "
Pennsylvania	5 75@6 25	" "
Maine	5 [illegible] 60	" "

BLACK—
(Michigan Slate Co., Lansing,)
Michigan ... $1 50 f. o. b. quarry

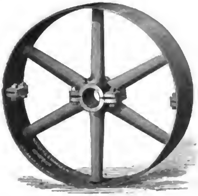
PURPLE ROOFING SLATE—
(Hazard Slate Company Fair Haven, Vt.)

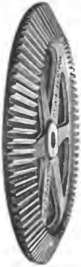
	First.	Second
24x12	$3 75	$2 25
22x14	3 75	2 25
22x12	3 50	2 25
22x14	3 85	2 25
20x12	3 85	[illegible]
20x10	3 85	[illegible]
18x12	3 50	2 25
18x10	3 50	2 25
18x 9	[illegible]	[illegible]
16x12	3 25	2 35
16x10	[illegible]	[illegible]
16x 9	3 00	[illegible]
16x 8	3 00	[illegible]
14x12	3 00	[illegible]
14x10	3 25	[illegible]
14x 9	[illegible]	2 22
14x 8	[illegible]	[illegible]
12x10	[illegible]	[illegible]
12x 9	[illegible]	[illegible]
12x 8	2 50	[illegible]

Nordyke & Marmon Co.

ESTABLISHED, 1851. FOUNDERS and MACHINISTS. ESTABLISHED, 1851.

All Kinds of Pulleys, Shafting, Couplings, Hangers, Gearing, Etc., Etc.

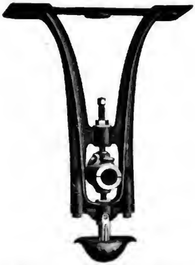


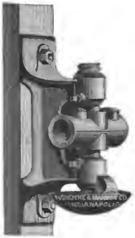


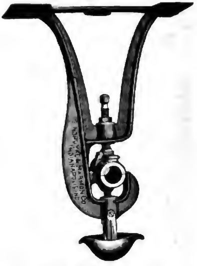
NORDYKE & MARMON CO. INDIANAPOLIS IND.

SPLIT PULLEYS. GEARING. DOUBLE-ARM PULLEYS

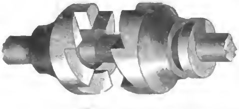
Accurately Cut Spur and Bevel Gearing, from the Smallest to the Largest Dimensions. Our line of Straight-Arm Pulleys is the most complete in the United States.

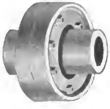


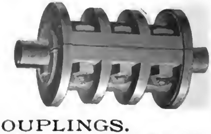



NORDYKE & MARMON CO INDIANAPOLIS IND

Open and Closed Adjustable Hangers of all Varieties.







PLATE, CLUTCH AND CLAMP COUPLINGS.

Our works are fitted with machinery of the latest improved construction, and lacks nothing to enable us to get out the best of work quickly, and at as small cost as possible. We will guarantee the most perfect work, and will meet all competition.

NORDYKE & MARMON CO., - INDIANAPOLIS, IND.

Catalogue and Price List sent free.

STONE

A JOURNAL FOR PRODUCERS WORKERS AND USERS OF STONE MARBLE AND GRANITE

VOL. I. INDIANAPOLIS IND., JUNE, 1888. NO. II.

IMPROVED BRICK MACHINERY!
The New Quaker Brick Machine and
Fletcher & Thomas' Spiral Pug Mill a Specialty.
Capacity, 25,000 to 40,000 per Day. Dealers in all Brick Makers' Supplies. Correspondence Solicited Send for Illustrated Catalogue.
FLETCHER & THOMAS, - 9 Ingalls Block, Indianapolis, Ind.

INGERSOLL Stone Channeling MACHINES.
Rock Drills, Quarry Bars,
· HOISTING MACHINERY, ·
AIR COMPRESSORS, ROCK CRUSHERS,
Stone Sawing Machinery,
Horse Powers, Derrick Castings, Blasting Batteries.
CHAS. W. MELCHER,
811 N. Second St.,
ST. LOUIS, MO.

NOTE OUR INVITATION
Top of Column, Page 30.

EXCELSIOR IRON WORKS CO.,
Founders and Machinists,
—Manufacturers of—
Steam Engines, Derrick Irons, Stone Hoisters,
Stone Gangs, and
GENERAL QUARRY SUPPLIES.
Cleveland, O.

BAILEY PORTABLE HOIST
STEEL OR IRON,
Has No Equal for—
Setting Monuments,
—And Such Work.
WE HAVE A LARGE NUMBER OF
Testimonials from Marble Dealers.
For Catalogues address
JAMES DUNN,
51 Rockwell-st., - Cleveland, O.

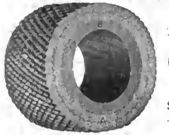
B. C. & R. A. TILGHMAN, 1118 to 1126 So. 11th Street, Philadelphia, Pa.
Patent Chilled-Iron Globules, or
SHOT,
For Fast Sawing and Rubbing of Stone.

NOTICE.—Our Shot have been in regular, constant and increasing use for over ten years, and are now used by all the leading firms in the United States. With the *same machinery* and *power* either saw or rub stone over *three times* as *fast* as sand.
No expense to try for yourself. Send for circular, price list, etc.

WARNING.—All persons are hereby cautioned that this process of working stone is our own invention, and is protected by Letters Patent which have been sustained in the courts against infringers, and that any one using this process without our license will be vigorously prosecuted by us. *Information of infringements liberally rewarded.*

SPEED. DURABILITY. ECONOMY. SAVING OF SAW BLADES. REDUCTION OF POWER. OVER 10 YEARS' CONSTANT USE.

"COWEN" PATENT STEAM HOSE



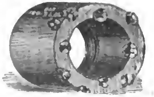
Equal to a 7-ply, Marline-Wound, Extra-Heavy Steam Hose.

GUARANTEED to stand a Continuous Pressure of 100 pounds six weeks; 50 pounds three months; 25 pounds six months.

Manufactured by the
BOSTON WOVEN HOSE CO., 222 & 224 LAKE STREET, CHICAGO, ILL.

Henry Leschen, Pres't. Edward M. Vossler, Vice-Pres't. John A. Leschen, Sec'y & Treas.
A. LESCHEN & SONS ROPE CO.,
Manufacturers of
WIRE ROPE
AND
Fittings for Same. Manila Rope, etc.
903 & 905 N. Main Street, - - ST. LOUIS, MO.

WRIGHT & ADAMS CO.,
Quincy Ill.
Hoisting AND Derrick ENGINES.



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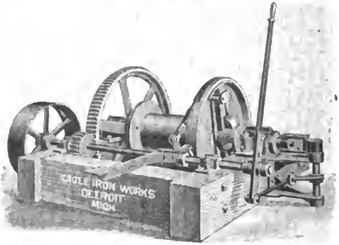
388 Eleventh-ave.,
NEW YORK,
—Importer of—
CARBON (Black Diamond) and BORTZ
For Sawing Stone, Rock Drills, Prospecting Mines.

FRICTION HOISTING DRUMS
SPECIALLY ADAPTED FOR



Quarry and Mining Purposes.
ANY DESIRED CAPACITY.
Substantially Constructed. Satisfaction Guaranteed.
STONE DERRICKS AND
STONE-SAWING MACHINERY.
Correspondence Solicited.
EAGLE IRON WORKS,
WOODBRIDGE, FIFTH AND CONGRESS-STS. Detroit, Mich.

THE CYCLONE PULVERIZER.
Will Reduce to the Finest Dust
Flint, Slate, Marble, Iron, Steel,
Or Anything Else Put into It.
MANUFACTURED BY THE
GEO. T. SMITH MIDDLINGS PURIFIER COMPANY, Jackson, Mich.

STONE

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VOL. I. INDIANAPOLIS IND., JULY, 1888. NO. III.

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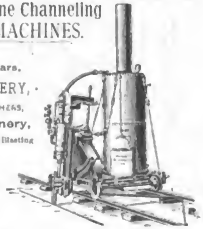

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Rock Drills, Quarry Bars,

· HOISTING MACHINERY, ·

AIR COMPRESSORS, ROCK CRUSHERS,

Stone Sawing Machinery,

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No expense to try for yourself. Send for circular, price list, etc.

SHOT,

WARNING—All persons are hereby cautioned that this process of working stone is our own invention, and is protected by Letters Patent which have been sustained in the courts against infringers, and that any one using this process without our license will be vigorously prosecuted by us. *Information of infringements liberally rewarded.*

For Fast Sawing and Rubbing of Stone.

SPEED. DURABILITY. ECONOMY. SAVING OF SAW BLADES. REDUCTION OF POWER. OVER 10 YEARS' CONSTANT USE.

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Toledo " 10 Lafayette-st.
Detroit " Woodbridge-st., bet. 5th & 6th.
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San Francisco Branch, 244 Brannan-st.

Main Office:
PROCTOR, VT.

QUARRIES, MILLS AND SHOPS AT
PROCTOR,
CENTER RUTLAND,
and WEST RUTLAND, Vt.

The Largest Producers of Marble in the World!

ROMONA OOLITIC STONE CO.,

Romona, Ind.
Office: 15 Ingalls Block, Indianapolis, Ind.
OOLITIC (BEDFORD) BUILDING AND BRIDGE STONE,
"BUFF" and "BLUE."

BAILEY PORTABLE HOIST

STEEL OR IRON,
Has No Equal for—
Setting Monuments,
—And Such Work.

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Office of BURRELL & WAGY.
DEALERS IN SCOTCH AND AMERICAN GRANITE ITALIAN AND AMERICAN MARBLE MONUMENTS.
ODON, Ind., June 27, 1886.

Mr. Dunn: We send you today by registered letter $40. in payment for hoist. To say that we are pleased with the hoist would be a tame expression of our opinion of it. We could write several pages on the merits of the Bailey Hoist, but suffice it to say that all the strength, reliability and ease necessary are combined in your machine. Mr Burrell's little boy of eight years raised, with the single purchase, a base three feet square and 15 inches thick. Success to you and the Bailey Hoist everywhere.

Yours truly, BURRELL & WAGY.

WRIGHT & ADAMS CO.,

Quincy Ill.

Hoisting and Derrick ENGINES.

QUARRYING MACHINES!

Diamond Drilling Machines
for Channeling and Gadding,
Improved Steel Gang Drills for Channeling.

SULLIVAN MACHINE COMPANY,
Claremont, N. H.

JAMES EVERSON. JOHN C. TEMPLE.

EVERSON & CO.,

—WHOLESALE DEALERS IN—

Brandon Italian, Valido Blue, and Rutland

MARBLE!

OFFICE AND FINISHING WORKS:
98 West-st., - - Rutland, Vt.

Photos, 10x14, $6 per Dozen.

HYDEVILLE MARBLEIZED SLATE MANTEL COMPANY.

—Manufacturers of—

ARTISTIC SLATE MANTELS,

Furniture Tops, Art Vestibule Work, Bracket Shelves, Wash Sinks, Bath T
Urinals, Grave Boxes, Lamp Bases, Turned Columns.

GRAINED MANTELS, IN IMITATION OF WOOD, A SPECIALT

Hydeville, Vt.

S. M. COYKENDALL, President. SAM'L COLES, Treasurer.

UNION BLUESTONE COMPANY,

280 Broadway, New York,--Stewart Building.

This Company is Sole Agent for the sale of the entire production formerly sold by the following Wholesale Dealers in North River
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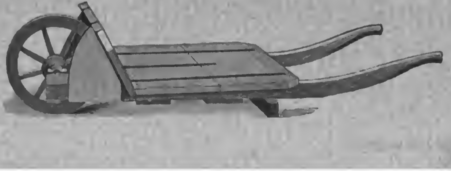

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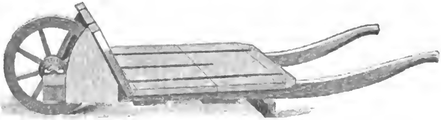

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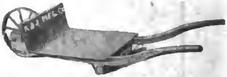

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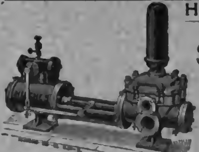

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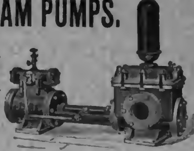

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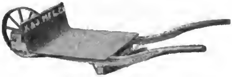

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